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ORIGINAL COMMUNICATIONS.

ART. I.—REMARKS ON HYDRATED PER-OXIDE OF IRON.

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The peroxide of iron has recently acquired an importance in its therapeutical and pharmaceutical relations, from its use as an antidote against arsenious acid, which renders any apology for the notice here intended to be taken of it altogether unnecessary. Indeed, some notice of its properties as an antidote, mode of preparation, and preservation, seems to me to have become indispensable, from at least one erroneous view in regard to it, which appears still to prevail, and which may in some degree restrict its use and diminish its value. This error consists in the belief that the antidote, to be effectual, must be *freshly prepared:* a dictum which reached our shores simultaneously with the knowledge of the peculiar properties, as regards arsenious acid, of the oxide itself. Subsequently, each one who has written upon this subject has attached value to this italicised caution, and has thus perpetuated, at all events until now, a direction which has a tendency to banish or exclude a valuable remedy from the shops, and to compel the unfortunate victim of malice or accident to await the hurried preparation of the means by which his pangs may be allevi-

ated. And this fresh preparation, too, has been required in the same breath in which we are told that not a moment's time should be lost in the administration.

Having contributed in some measure to the continuance and extension of this belief, in a table of poisons and antidotes, prepared for the General Therapeutics of Prof. DUNGLISON, published in 1836, it appears to be my particular duty to disabuse the pharmaceutic and medical public of this impression, and to show that the fresh preparation of the hydrate of peroxide of iron as an antidote to arsenious acid, is not necessary, and that any such view of its character is unsustained by sound philosophy or experience.

It is not necessary that the various authorities for the use and successful employment of this antidote should be here reviewed to establish its value. Enough has already been shown in other journals to satisfy the most incredulous, and it is only necessary to refer those who may yet need information on that score, to the contents of this Journal, Vol. 10, page 263, and the American Journal of the Medical Sciences, Vols. 15, 16, 20, 23, 24,* for experiments and cases which must prove fully satisfactory. Considering, then, its value as an antidote established by these records, let us examine the substance chemically, and see in what manner its character, composition, or properties can possibly be so altered by age or exposure, that its use would be rendered fruitless. It consists of iron combined with oxygen, and in those proportions, too, in which of all others these substances delight to combine. Into which combination, not only iron itself, but all its compounds containing less oxygen, spontaneously pass, when exposed to the air for any length of time; in other words, when kept. This state of oxidation, then, is that in which it is not difficult to retain the metal, and is one

* Vol. 15, page 537, reported by Drs. Bunsen and Berthold.
" 16, " 239, " " Prof. Orfila and Dr. Leger.
" 20, " 222, " " Mr. John Robson.
" 23, " 503, " " Dr. John Murray.
" 24, " 243, " " Dr. Deville.

from which the metal does not spontaneously pass by exposure or prolonged keeping.

If it undergo no change from these causes, how can age affect it, or why must it be fresh? Will the carbonic acid of the atmosphere, by combining with it, neutralize its properties, and thus affect its value? Such is not the case. Peroxide of iron has less affinity for carbonic acid than the protoxide, so much so, that the precipitated carbonate of iron, which is a protosalt, when first formed, loses nearly all its acid, by its base passing to the maximum of oxidation, as is well known, and established beyond a doubt. If kept with any kind of care, carbonic acid is the only acid to which the oxide could be exposed, and we have seen that carbonic acid opposes no barrier to the preservation of the oxide. Theory, then, affords no reason why the antidote should be *freshly prepared.* Experience gives us an equally strong reason against it. In the latter part of September, or beginning of October, 1837, I was called upon in great haste for some *freshly prepared* antidote for arsenious acid, for a patient suffering from the poisonous effects of arsenic; with all possible expedition the antidote was prepared, but too late for the relief of the victim; although no time had been unnecessarily lost, the patient expired as the first doses were administered. During this preparation, which was the first I had made of this oxide, it occurred to me forcibly, that if it were suffered to remain diffused through the water in which it had been washed, that it would always be in the condition of a recent precipitate, and, in accordance with this view, it was so put aside. The antidote remained in the laboratory of the University of Maryland, unnoticed and untouched, except on one occasion, when it was exhibited to the medical class of the ensuing winter, as a specimen, until June 1st, 1838, when I was called upon by my friend, Dr. Thomas, for some of the antidote. Having none other to supply him with but this, prepared, at the least, eight months before, recourse was had to it. The result of its use is detailed by the doctor in the American Medical Library and Intelligencer, of July 16th, 1838. It is only ne-

cessary here to say, in regard to it, that the patient for whom it was employed, recovered.

The cases here quoted, serve the double purpose of showing the fatal consequences which may result from the loss of time consumed in the preparation of the antidote, and that *freshly prepared* hydrated peroxide of iron is not necessary to render arsenious acid insoluble and innocuous.

Theory and experience, then, both concur to sustain the position which I assumed at the commencement, and, I trust, will induce those whose province it is, to be constantly prepared with the means which have been shown to be worthy of firm reliance. Did not our knowledge of the properties of peroxide of iron teach us that it can undergo no change by age or exposure, I should not rely so confidently upon the single case known to me; but the result in that case was so exactly in conformity with the inductions from theory, that it deserves to be regarded as positive evidence.

Independently of my own observations, the experiments of Dr. Von Specz,* Professor of Chemistry in the Theresian Academy of Vienna, sustain the opinion herein advocated, by showing, 1st, "that this preparation, when properly made, and preserved in bottles, with good glass stoppers, will retain its virtues for a very considerable time." 2d, "that rust of iron, and hæmatite, although they do not prevent all the bad effects of arsenic on the system, may, in defect of the hydrated peroxide of iron, be employed as antidotes to that poison." And the case reported by Mr. John Robson† also corroborates this view. He having no hydrated peroxide of iron at hand, administered six drachms of the carbonate of iron in water, in two draughts. "The patient said his stomach felt cooler. His pulse fell from 130 to 112. The pain ceased, or nearly so." Now it will be observed that in none of the cases here referred to, was *freshly prepared* hydrated peroxide of iron the agent by which the antidotal effects were

* American Journal of Medical Sciences, Vol. 21, page 519.
† " " " " " 20, " 222.

produced. Dr. Von Specz employs the powder in all his experiments with the hydrated oxide, which could not have been an immediate preparation, finds that it can be preserved a considerable time, and finally discovers that other peroxides may be used in default of the hydrate, one of which is as old as the creation, the other, age unknown. It is true the hydrate is always to be preferred, but its place can be supplied. Dr. Robson also gave the hydrated oxide as soon as it could be got ready, (an hour and a half after the carbonate was given,) but his patient had been already relieved by the *old* preparation, first swallowed. The recent preparation was not *well washed*, and many urgent symptoms supervened upon its use. "He (the patient) said he felt sick, and worse after taking the physic." The next morning, the prepared oxide, more carefully washed, was given. "It was not so good to take, but he had no more sickness," &c.

These, then, it is asserted, prove that age is no obstacle to the effects of peroxide of iron; that it can be kept, and that the precipitated peroxide must be thoroughly washed. It can scarcely be necessary to remind the readers of a scientific journal that the carbonate of iron, and hæmatite, are almost wholly peroxide of iron. The former containing a trifling amount of carbonic acid; the latter, perhaps, some siliceous or earthy matter. My own view is, that these would be equally efficacious as antidotes, if in an equally impalpable state, with the precipitated peroxide.

The only possible reason which I can conceive for requiring the oxide to be freshly prepared, is that it may be administered in as finely divided a condition, as nearly approaching solution as possible; and this certainly can only be accomplished by employing it in the pulpy state of a recent precipitate. This state is, however, not inconsistent with age, and may always be preserved, for any reasonable length of time, as I know by experiment, simply by suffering enough of the water with which the precipitate has been washed, to remain, in order that the oxide may be diffused through it. So very minutely divided is the oxide in its precipitated state, that a trifling

agitation serves to distribute it promptly through the supernatant fluid, which thus forms a medium for its administration, as well as a means for apportioning the dose. This mode is that which has been employed in the preservation of all the hydrated peroxide which I have ever made. Theoretical considerations induced me to employ it, counter to the dictum against which I now write; and experience, in the case already quoted, so fully satisfied me of the advantages to be derived from it, that I at once commenced the preparation of a large supply of the antidote, so that any future case might not be deprived of the benefit which can be obtained from its immediate use. Some of the oxide, prepared in June, 1838, is now by me, and to all appearance is entirely unchanged. No critical examination could distinguish it from a preparation a week old. Several friends, who have seen it, concur in this opinion.

It was my intention to have here rested the argument, but just as it was completed, I was indebted to the kindness of Mr. Durand, who, ever anxious for the diffusion of information, and the improvement of our science, placed in my hands the twenty-fourth volume of the "Journal de Pharmacie," Paris, 1838, containing a communication from Drs. Bunsen and Berthold, "*On the mode of preparing in the most convenient form the Hydrated Sesquioxide of Iron, as an Antidote to Arsenious Acid.*" To these gentlemen we owe this employment of the hydrated oxide, and I therefore, with the greater pleasure, adduce their testimony in favor of the views which have been herein urged.

As the subject now under discussion is in regard to the preservation of the oxide, the latter portion of their paper is first quoted, in their own words: "It is altogether inconceivable," say they, "that any one, relying upon uncertain experiments with animals, should have recommended the preservation and use of the antidote in a dry state, since a number of experiments already made, coinciding with our own, tend to this result, that the action of the sesquioxide of iron is null, and that of the *dry* hydrate incomplete; of which, the

simple fact that the dry hydrate does not ever precipitate, wholly, in the cold arsenious acid, should have previously apprised every one."

"The recommendation to dry the product seems to arise from the erroneous opinion, that the hydrate undergoes a change, and loses its efficacy by long preservation. We have it in our power to refute this view of it, since we have found that a precipated hydrated sesquioxide obtained from carbonate of iron, enclosed in the cavity of a mass of travertin (sedimentary carbonate of iron,) removed from under water, had preserved its efficacy, notwithstanding the geological conditions of the mass of travertin, demonstrated that many ages, at least, ought to have rolled over since its deposition took place. This precipitate of the sesquioxide owes its action altogether to its gelatinous hydrated state, which was perfectly preserved under the bed of water, beneath which it was deposited. It would, however, be a great error to attribute the same efficacy to dry ochre, to bog iron ore, (fer oxidé des marais,) or to the argillaceous oxide of iron ; these substances, from their mode of aggregation, are equally inert, with the deposit produced in the water, in which smiths cool their iron, which is not a hydrated sesquioxide, but a deposit of the mixed oxides. This last substance is not even inert, on account of its sharp corners, which would prove a source of dire consequences."

There is an apparent difference of opinion between the value of the peroxide, as employed by Dr. Von Specz, and the authors here quoted, but so far as regards the necessity of a recent precipitate, they concur, and fully sustain the opinions which I have advocated. Dr. Von Specz, indeed, requires that the oxide shall be administered in the form of an emulsion, in which, if properly prepared, it must be completely divided and thoroughly diffused.

The conclusions, then, which I consider established, both by the evidence here offered, and the absence of evidence to the contrary, are,

1st. That we are justified in believing that peroxide of iron undergoes no change from age, by inferences drawn from the known great affinity of iron for oxygen.

2d. That the discovery of native peroxide, entirely unchanged, affords positive testimony of the foregoing position.

3d. That relief has been afforded by the use of the peroxide of indeterminate age.

From which, as a necessary consequence, it follows that neither reason nor observation sustains the opinion that the precipitated hydrate of peroxide of iron *must be freshly prepared* to render it available as an antidote to arsenious acid.

In regard to the precipitated hydrate of peroxide of iron, it is proved,

1st. That, owing to its state of aggregation, when moist, it is the preferable form in which to administer it as an antidote.

2d. That it should be well washed before being so employed.

3d. That the extemporaneous preparation of the antidote is inadvisable, because time is lost in the administration, beside the inability to wash it.

4th. That the hydrated peroxide of iron can be preserved any length of time unaltered, and ready for immediate use by suffering it to remain diffused through a portion of the water in which it has been washed, corked up in bottles.*

And lastly, That every apothecary, and physician residing in the country, should always be provided with the antidote thus preserved in bottles of a convenient size for use.

Enough, has now, certainly, been said to establish the position which I undertook to demonstrate, and a few comments upon the mode of preparation are now offered. Several modes have been suggested for the preparation of this oxide, which, although varied in detail, are essentially the same in princi-

* These first, second, and fourth positions receive additional strength from the directions given by Drs. Bunsen and Berthold for making this oxide. They will be mentioned further on, and although not italicized in the text, have been so printed here to distinguish them.

ple: effecting the oxidation of the iron to its maximum extent, by the decomposition of nitric acid, and precipitating the oxide thus obtained by ammonia.

It is unnecessary to review these formulæ in detail, further than to indicate a few reasons for the preference given to the formula here proposed. If nitric, or nitro-muriatic acid be employed as the solvent of the iron, as prepared by one author, violent and inconvenient action, and great heat, attend the operation, and the clothing and utensils of the operator encounter some risk. To this objection our formula is not exposed. And the direction given by the same authority for "*drying the powder in the shade,*" is entirely inconsistent with our whole object, the preservation of the oxide in a pulpy state. Another writer, anonymous, it is true, but one who evidently understands his subject, offers two formulæ for this preparation. The former of which, with the exception of not affixing quantities, coincides exactly with our mode of preparation, although nothing is said by him of preservation, and one expression of which is quoted in his own words, because reference will shortly be made to it: "The alkali throws down the hydrated peroxide as a reddish precipitate, which must be carefully washed." In his second process he speaks of its extemporaneous preparation, "by boiling aqua fortis in a common iron pot, with some iron filings or nails, for a few minutes, pouring off the clear liquor, and then adding to the fluid a saturated solution of carbonate of soda, the hydrated peroxide will be precipitated in the form of a reddish powder. A saturated solution of the nitrate of iron, as also of the carbonate of soda, may be kept in separate bottles in the office of a physician, and the antidote made whenever required, by merely mixing a portion of each solution with the other." To this formula and recommendation there are two objections, of which one may be regarded as serious, viz.: that by this extemporaneous preparation the oxide is not washed, and the highly irritated, if not inflamed, mucous coats of the stomach and œsophagus are deluged with a concentrated solution of nitrate of soda, "whose irritant properties," says Professor DUCATEL, in his

Abridgement of Christison, "will be found, most probably, to produce the same effects on the animal system as the nitrate of potassa." Such analogy should certainly deter us from the use of the extemporaneous preparation. Indeed, the author himself says above, in his first formula, the precipitate "must be carefully washed," indicating his own views of the necessity of removing the new alkaline salt, and exhibiting a decided inconsistency between his formulæ, which nothing but an accidental oversight could have caused.* The other objection to this formula is of less importance and has already been suggested in the first comment made upon the use of nitric acid for dissolving the iron.

It is believed that no objection of moment can be made to the proposed formula, herein commended; indeed, the chief defects in those already reviewed, arise from the anxiety to employ the preparation in its recent state, which it has been the object of this notice to prove unimportant. That it did in one case at least deprive the sufferer of its benefits, and, consequently, of his life, I am fully persuaded; and seriously have I regretted having given implicit credence, without proper reflection, and a recurrence to principle, to the idea that only a freshly prepared oxide could be relied upon.

The formula now offered is definite in its proportions, and if carefully observed, will furnish a result upon which reliance may be placed. It is based upon the equivalent proportionals of the materials, and is made to coincide as nearly as possible with the preparations of the United States Pharmacopœia, the officinal acids being employed. At my request it has been subjected to practice by Mr. DURAND, who has

* It may appear hypercritical to allude to the irritant properties of these nitrates, when so powerful an irritant as arsenic is to be counteracted, and if their presence was unavoidable, the comment might be attributed to an ultra disposition to find fault; but, as it has been shown that the properties of the antidote may be enjoyed unattended with accompanying irritation, these remarks are made with an honesty of purpose which, it is trusted, will be ample to disarm them of any apparent malice or discourtesy to the author.

obtained a very perfect result, with a satisfactory economy of material.

Hydrated Peroxide of Iron.

℞.—Sulphuric Acid,	(67° Baumé,)	8 oz.	16 parts.
Iron Wire,		8 oz.	16 "
Nitric Acid,	(49° Baumé,)	5½ oz.	11 "
Water of Ammonia,		q. s.	
Water,		1½ gal.	384 "

Mix the Sulphuric Acid with the water in a glass vessel. Add the Iron, and, after the effervescence has ceased, filter. Add the Nitric Acid in divided portions, and apply heat so long as orange colored fumes are given off. To the heated solution, pour in the Water of Ammonia until a decided excess has been added, then wash the precipitate by decantation, until the washings give no precipitate with Nitrate of Baryta. The water is then to be drawn off until just enough remains to give the consistence of thick cream. It should be introduced into bottles of convenient size for use.

Bottles containing half a pint are recommended as convenient; and the annexed direction, it is thought, will enable the most ignorant to use it until medical advice can be obtained. "This antidote must be administered *as soon as possible* after the discovery that arsenic has been taken, and as it produces no bad effects itself, should be given *every five or ten minutes, until entire relief is obtained.** The dose for a grown person is a table-spoonful; for children, a dessert spoonful. The bottle must be well shaken before each dose."

The following remarks on the preparation are from the paper of Drs. BUNSEN and BERTHOLD. After giving directions for the preparation, by means of sulphuric acid, iron,

* It is considered better to administer it thus in doses until relief is obtained, than to endeavor to give four, eight, or twelve times the amount of arsenic taken, which, for obvious reasons, can seldom be known.

nitric acid, and ammonia, without specifying proportions, they proceed: "It is necessary not to lose sight of the fact, that the solution of the salt of iron must be complete before adding the nitric acid in small quantities, otherwise, a considerable amount of a neutral sulphate of peroxide will separate in the form of a yellowish powder, which is very slightly soluble. The chloride of iron affords a means of preparing this body still less eligible, because the risk is run in precipitating, by ammonia, of obtaining an admixture of a large quantity of subchloride of iron."

"*In order that the hydrated sesquioxide may not be deprived of its water, and by this means of diminishing, in the least possible degree, its feeble state of aggregation, it should not be filtered, but after having been suffered to subside for several days, the supernatant fluid being poured off, it must be preserved under water in closed vessels.*"

"Simple as is the process here indicated for the preparation of the antidote, there have been, nevertheless, modifications proposed, some of them so unfit that we believe it useful to add some remarks on this subject. First of all, there is one practice which ought to be rejected, that of employing another alkali than ammonia for the precipitation of the hydrate of the sesquioxide of iron, as some have done; in fact, the least quantity of alkali retained in the precipitate will give rise to the formation of an arsenite, which would abstract itself entirely beyond precipitation by the hydrate of sesquioxide of iron, because, although this base can prevail over the affinity of ammonia for arsenious acid, it could not over that of soda or potassa."*

The subject is now submitted for the deliberate examination of the two professions who are interested in its determination, and upon whom no greater reward can be bestowed

* This may have been the mode employed by Dr. Robson, whose patient found himself worse after having been relieved, upon using an imperfectly washed precipitate; and felt no pain after using some which had been well washed. See Amer. Journ., Vol. 20, page 222.

for the labor of the investigation which it merits, than the reflection that they are about to increase their ability for usefulness, and to divest the dreadful anticipation of poison of some of its risks and horrors. In treating this important question, my sole motive has been the promulgation of truth, and banishment of error; and in combating the opinions of many who are entitled to the highest respect and confidence, I have deemed it indispensable to my own immunity from a charge of rashness, to produce evidence of the strongest character, depending upon facts which, it is believed, cannot be refuted. The introduction of therapeutical considerations has been avoided as much as possible, and only employed when essential to establish the value of particular preparations, and to enlighten pharmaceutical research.

Philadelphia, March 27th, 1840.

ART. II.—ON THE POWER OF SACCHARINE SUBSTANCES IN GENERAL, AND UNCRYSTALLIZABLE SUGAR IN PARTICULAR, OF PROTECTING THE SOLUTION OF PROTIODIDE OF IRON FROM DECOMPOSITION.

By William Procter, Jr.

To be able to protect the solution of protiodide of iron from decomposition, and, consequently, to preserve its medicinal power unimpaired, has been a desideratum to the medical practitioner, as owing to the gradual but certain process of reduction of the strength of the solution, this preparation is one to which the physician is compelled to look with suspicion, not on account of any original want of power in the remedy, but by reason of the process of deterioration which is constantly progressing, often, notwithstanding the recommended precaution of keeping metallic iron in the solution. It is true that, when this is done in a proper manner, there is

a mere transfer of iron from the protecting metal to the iodine of the decomposed salt, as it is gradually effected, while its base is deposited in the state of peroxide. But even allowing this protecting power to be fully exercised, the ferruginous deposit, making the solution turbid, not to speak of the iron filings or wire, renders it inelegant, and frequently subjects the apothecary to the inconvenience of filtering the solution before dispensing it.

Thus far we have been viewing the subject within the precincts of the apothecary's store, but the most serious difficulties yet remain to be considered, viz.: after the remedy is placed in the hands of the patient. Some pharmaceutists take the precaution to introduce small quantities of metallic iron into the vials of the solution before selling it, but this is by no means general. As the remedy is taken in small doses, and its exhibition sometimes continued through considerable periods of time, the frequent opening of the vial, not to say the liability of leaving it unstopped, as must often be the case, causes the decomposition to go on rapidly when it is not in contact with iron. In corroboration of these remarks, I have the testimony of one of our first physicians, who informed me that he had discontinued the use of this preparation in his practice, in consequence of its great variation in strength.

I have deemed it proper to make the foregoing remarks as introductory to the following observations and experiments, which were made with the object of discovering a remedy for the evils which we have seen detailed.

The agents employed belong to the saccharine substances. The first application of one of this class of substances as a protective agent in pharmaceutical manipulation, was by VALLET, in his now celebrated ferruginous pills.

Shortly after the formula for his preparation was published in this country, I gave a process for preparing a tincture of *protomuriate of iron*, (Vol. X. p. 272, of this Journal,) which was kept in the state of a protosalt, through the intervention of honey. It was this idea which suggested the power of the same agent in preserving the solution of protiodide

of iron, and the sequel will show how far the suggestion has been realized.

As it is our duty at the time we are pursuing a course of investigation, to note *all* the phenomena that offer, perhaps it will be well to give an idea of the *relative* protecting power of several saccharine substances, so as to be able to appreciate their importance, and to ascertain, if possible, some general principle which will account for the variation in their protective power.

The substances tried were sugar of milk, manna, cane sugar, honey, and uncrystallizable sugar.

The uncrystallizable portion of honey and molasses was obtained by mixing the honey or molasses with twice its weight of alcohol. The cane sugar precipitates, if molasses is employed, and the crystallizable honey, if honey is used, and by evaporating the solution, the preparation is obtained free from alcohol. They should be decolorized as much as possible, by boiling with animal charcoal, before being used.

1st. The power of sugar of milk and manna in protecting the iodide is very slight, although they each may possess the property in a limited degree. The trials which were made, however, offer convincing proof of their inadequacy to perform the purpose in view.

2d. Three drachms of the solution of protiodide of iron was mixed with one drachm of simple syrup, and placed in a vial exposed to light and air. In a similar vial a like quantity of the solution was placed without the addition of syrup, and equally exposed to air and light. At the end of forty-eight hours the saccharine solution remained transparent, possessing its original color, while the other had acquired a brownish hue. They remained thus exposed to air and light for two weeks—at the end of that period the unprotected solution had deposited a considerable quantity of peroxide of iron, and was strongly charged with free iodine. The saccharine solution was also colored, but in a very slight degree, with an equally small deposit of ferruginous oxide, but we must be

aware that this occurred after a full exposure to *air and light* for two weeks.

3d. Three drachms of the solution, as before, was mixed with two drachms of simple syrup, and the mixture exposed for five days to air and light. On examination, the solution remained perfectly unaltered, not communicating the slightest tinge to starch water, or exhibiting any precipitate whatever.

The vial was then corked, and left exposed to the light. Twenty-two days after the commencement of the experiment, the first evidence of free iodine was manifested, and to this time, nearly two months from that date, the solution remains so little altered that the presence of free iodine is hardly perceptible, and the deposit of oxide equally minute; there being none whatever on the sides of the bottle.

4th. Three drachms of solution of protiodide of iron was mixed with one drachm of honey, and the mixture filtered, to render it perfectly transparent, and then exposed to air and light for three days without being the least affected. Twenty days after, the solution remained unchanged, and one month had elapsed before the slightest trace of free iodine could be detected. Two months after decomposition had progressed so tardily, that if no other protective agent existed, this would be better than iron.

5th. Three drachms of the iodous solution were mixed with one drachm of uncrystallizable honey. The mixture was treated precisely as in the last experiment, and was found to answer more effectually than the unaltered honey.

6th. Three drachms of the solution, as before, was mixed with two drachms of uncrystallizable sugar, (of molasses.) The mixture was then exposed several days to light and air without the slightest alteration. Nearly two months have elapsed since the beginning of the experiment, and not the slightest trace of free iodine, or of oxide, have been separated, notwithstanding it has been tested twenty times with solution of starch.

7th. To exhibit the protecting power of these agents more pointedly, two vials, with wide mouths, were nearly filled

with filtered starch water; to one was added a few drops of the protected solution, to the other an equal quantity of the unprotected solution of iodide of iron. At the end of twenty-four hours the presence of free iodine was rendered evident in the latter by the blue color acquired by the starchy solution, whereas the former remained colorless.

8th. Thinking, notwithstanding the present protective power of the agents, that the increased temperature of summer might cause fermentation, and thus render the protector worse than useless, four ounces of the solution, protected with uncrystallizable honey, was placed in a vessel of water, the temperature of which varied from 80° to 100°, Fah., for nine days. At the end of this period no signs of fermentation were evidenced, and no free iodine existed in the solution. The exposure to heat was then discontinued, under the impression that if disposed to ferment, the solution had ample time to give notice of it.

It remains now to offer a formula for the proposed preparation. The strength of the following is that proposed to be adopted at the late convention on the Pharmacopœia:

℞.—Iodine,	. . . . .	ʒxi.
Iron filings,	. . . .	ʒiv.
Syrup,	. . . . .	
Uncrystallizable honey, or		
Uncrystallizable sugar,	. .	℥iv.
Distilled water, a sufficient quantity.		

Mix the iodine with eight fluid ounces of the distilled water, and gradually add the iron filings, stirring constantly; then apply a gentle heat until the solution shall have acquired a light green color, or shall not give a blue color to the solution of starch, then add whichever of the three protecting substances may be chosen, and continue the heat a short time, and filter. Lastly, wash the filter with as much distilled water as will make sixteen fluid ounces of solution of protiodide of iron.

When either sugar or honey is used, the color of the solu-

tion is very little altered, while it is rendered much more palatable.

To the physician, the foregoing remarks are believed to be fraught with advantage, as it gives him the power to control the efficiency of his remedy by merely directing a quantity of simple syrup to be mixed with the solution, when he has reason to believe that it is not done previously, and increasing the dose proportionably. To the pharmaceutist it offers to be equally beneficial, by rendering a preparation, hitherto uncertain and inelegant, permanent in its medicinal power, and free from a sedimental deposit, which, he will admit, adds nothing to the appearance of his bottle.

ART. III.—ACCIDENTS FROM ARSENIC. By John Millman.

The frequent accidents which occur from the great facility of obtaining arsenic for destroying rats, and also for criminal purposes, render it incumbent upon all those who vend the article to adopt such measures as would enable any one to detect its presence in the ordinary articles of food, &c., it might be mixed with.

In France, where the legal restrictions imposed upon the sale of poisons are infinitely more strict than we can ever expect them to be in this country, we find gentlemen of our profession deeply interested in this subject, and recently Mr. Grimeau's plan has been submitted to the consideration of the Pharmaceutical Society of Paris. Mr. G. proposes to color all the arsenious acid, sold in commerce under different denominations, with a mixture of sulphate of iron and cyanuret of potassium; the minute proportions of a hundredth part of each of those substances would suffice to impart such striking colors to the various articles of food, &c. which it might have been mixed with, as would at once serve as a caution to the least experienced eye. In cases where the above preparations had

been given with criminal intent, judicial investigations would be much aided, inasmuch as the coloring effect would last several days.

Should arsenic be needed to mix with lime, for seeding, "chaulage," Mr. G. recommends, in addition to the above, spirits of turpentine; and for medicinal and veterinary purposes, oil of lavender, in sufficient quantities to give a very strong odor to the mixture.

How far Mr. GRIMEAU's plan would tend to diminish the evil under consideration, is a matter well worthy our deep solicitude. Perhaps it may be in our power, by the adoption of some such precautionary measures, to supply the want of legislative action upon so important a subject.

This is also a proper occasion to remark upon the distressing occurrences occasioned by laudanum, and the stronger preparations of opium, which are so heedlessly placed within the reach of all, without any safeguard. Could not some regulations be adopted with regard to these also? Such as selling those preparations in vials, so strikingly different from those in common use as to secure the attention of the most negligent. Here, also, it must be admitted, a reform is needed: how often has laudanum been given for paregoric, although the vial has been labelled as the law directs?

ART. IV.—NOTE UPON GENTIANA CHIRAYITA.

To the extensive and well known family of Gentianeæ, belong numerous species which are valuable for their medicinal qualities. Although closely resembling each other in botanical characters, they are equally remarkable for the similarity of property, connected with their bitterness, which universally pervades them, and which, with few exceptions, permits the substitution of one for another, when employed as medicines. In the Flora of every explored region of the earth, are found one or more individuals which have been ascertained to possess the qualities of the class in an eminent degree, and on this account have been selected to occupy a place in the list of the Materia Medica peculiar to that region. The species under consideration is a native of India, whence it has been brought to Europe, and, within a few years, has attracted some attention. The information we possess of its history and virtues is derived from several sources; upon these we draw for the remarks to be presented to our readers.

The following are the names given to it by different authors:

Gentiana chirayita.—Roxb. *Hor. Corom. and Asiat. Researches.*

Henricea pharmacearcha.—Lem. Lis. *Bul. Soc. Philom.*

Swertia chirayita.—Hamilton.

Description.—This plant is herbaceous, two or three feet high, branched; the stems are woody, as thick as straws, round, smooth, and jointed, containing a large medullary canal, of a yellow color; the leaves are amplexicaul, lanceolate, acute, entire, smooth, and three or five-veined; the flowers are yellow, in terminal spikes; the corolla is five-parted.

It has no odor, and the taste is very bitter. In the Linnæan arrangement it belongs to the class *Pentandria*, order *Digynia.*

Chirayita is found upon the Coromandel coast of the Peninsula, and in the district of Nepal.

We are informed by PEREIRA that it is imported into England tied up in bundles, and that the plant is pulled up by the root, about the time the flowers begin to decay, and when the capsules are well formed. That which we have received is cut into small fragments.

Dr. AINSLIE says, what appears in the bazaars of Lower India, under the Tamul name of *chayret toochie*, are small stalks, of a light gray color, and very bitter but pleasant taste.

An analysis of the plant has been made by LASSAIGNE and BOISSEL, who present, as their results, the following composition: resin, yellow bitter matter, brownish-yellow coloring matter, gum, malic acid, chloride of potassium, sulphate of potassa, phosphate of lime, and oxide of iron.

In India it is employed as a stomachic in dyspeptic complaints, and as a febrifuge in intermittents. According to ROXBURGH, it is prescribed as a substitute for cinchona, when that bark cannot be procured. The credit of making it known in Europe appears to be due to M. LESCHENAULT. Beside the tonic power which, like all its congeners, it possesses to a considerable extent, others have been claimed for it, which, if verified by experience, will much enhance its value as a remedial agent; we fear, however, that partiality for a new substance has carried its advocates too far in their encomiums, as it exhibits too little difference of composition, when compared with other species of gentian, for the existence of marked difference in properties. Thus, Dr. CURRIE has supposed "that he recognised in it an especial action upon the abdominal organs, especially upon the liver, for, during its use, the stools became more bilious, the complexion clearer, and he was induced to employ it in obstructions." And in his lectures, published in 1838, Dr. SIGMOND will be found to employ the following language: "It seems that not only does it act upon the stomach, imparting to it a greater degree of vigor, so that the increase of the gastric juice is attendant upon it, and thus the first process of digestion promoted, but the secretion of the liver is materially improved by it, for I have always found that, where it has been given, the stools

have speedily acquired the healthy tinge of bile, and also the muscular activity of the bowels has been increased, for the peristaltic action becomes more regular, and performed with more decided periodicity." "Its beneficial effects are generally more permanent than the greater number of bitters, nor does it, as most of the barks, woods, and roots which we employ for dyspeptic states, and for all that host of morbid affections which depend upon disordered function of the stomach and bowels, ever constipate the bowels, or interfere with the healthy function of the liver; on the contrary, it corrects the secretion of the bile, and gently operates on the bowels." And again, "I have often found chirayita very much to be preferred to sarsaparilla, when large quantities of mercury have been taken, and often, after salivation has been produced, the system more quickly recovers its lost equilibrium than from the use of any other drug with which I am acquainted. It has likewise been strongly recommended in leucorrhœa, dependant upon a general relaxed condition of the female frame; it has even been called a specific remedy. At that period of life in which the menstrual secretion is about to disappear, and in which there is great carefulness to be remembered, lest the employment of medicines injudiciously may lay the foundation for disease of the uterus, or in the mammæ, this tonic is very effectual; it produces no determination to any of the organs, but combines the power of invigorating, with that of removing obstructions." Whether this is a high wrought picture of the effects to be derived from the therapeutic application of this new remedy we leave to be determined by future observations.

Chirayita yields its virtues to water and alcohol. A concentrated infusion is productive of nauseating and irritating effects upon the stomach; that made of the strength of half an ounce of the plant to the pint of water, is sufficient for all purposes.

A formula is given by Dr. Sigmond for the preparation of the tincture, which is, to macerate five ounces of the chirayita for fourteen days in two pints of proof spirit. "This contains

all the powers of the herb; it forms a very strong but very pleasant bitter, by no means unpalatable. It is grateful to the stomach, and diffuses throughout the system a general warmth." The dose is a tea-spoonful.

If given in substance, the dose is one scruple, powdered.

Another point of interest connected with this plant arises from the circumstance of its having been supposed by GUIBOURT to constitute the *Calamus verus* of the ancients. This supposition is based by him upon its characters. It has been shown, however, by FEE, by drawing a parallel between the description of the two plants, that such an assumption cannot be relied on, as the characters of *Calamus verus*, which are given by THEOPHRASTUS, DIOSCORIDES, and PLINY, have no correspondence with those of gentian, and the sensible qualities also are different. J. C.

ART. V.—ON SALEP. By AUGUSTINE DUHAMEL.

THE term Salep is applied to a preparation which is made from certain bulbous roots belonging to plants of the tribe *Orchideæ*, and which commerce brings to us from Natolia, a province of Asiatic Turkey, and Persia.

The orchideous plants are very numerous, and are supposed to exceed fifteen hundred species. They belong to the class *Gynandria*, and are remarkable for the anomalous structure of their flowers, from the circumstance of the pistils and stamens growing united together. They are found scattered throughout the face of the globe, and in all countries not remarkable for extreme frigidity or dryness. They grow most luxuriantly in the hot, damp parts of the East and West Indies, Madagascar, the humid forests of South America, and similar situations in Europe. They are noted for their extreme beauty, singular variety, and delicious perfume. The different species vary a great deal in the aromatic principle

pervading their flowers. Some of them diffuse a very mild and pleasant odor, some none at all, others a highly fœtid odor.

The roots of the orchis are fibrous, accompanied by one or more round or elongated bulbs; in some species they are palmate or digitate. The stalk of the orchis issues from a tuber which nourishes it, and by consequent gradual exhaustion becomes withered. But in proportion as the stalk begins to spring out from the tuber, it sets off, between several simple radicles, a new tuber, which increases in size and outlives the stem as well as parent tuber, so as to propagate the species. The withered tuber continuing to exist, while its successor, for the following year, is in process of developement, causes the number to be double during nearly all the time of vegetation.

The species from which salep has been most commonly obtained are the *Orchis mascula*, *pyramidalis*, *latifolia*, *maculata*, *morio*, *conopsea*, *hircina*, *fusca*, and others, but principally from the first mentioned of these, which is the most abundant. Independently of these, the *Ophrys anthropophora*, *apifera*, *arachnitis*, &c., likewise produce it.

Salep, as we receive it, is exhibited in the form of small masses, resembling pebbles, strung together, from the size of a grain of coffee to an almond, ovoid in shape, of a yellowish-white or gray color, sometimes semi-transparent, and of a horn-like fracture. These masses are so very hard as to be with difficulty reduced to powder. The powder is grayish-white, and gifted with a feeble odor, somewhat like melilot. In taste it is like gum tragacanth, sometimes slightly saltish. These physical characters which give it so much the appearance of a gum, are reasons why salep was not supposed, for a long time, to be a root, until attention was drawn towards it by Matthieu de Dombasle, Geoffroy, Retzius, and other contemporaneous writers, who succeeded by experiments upon the Orchis indigenous to France, in discovering a method of preparing the bulbs in such a manner as to render them identical with Oriental salep, and thereby established the possibility of its culture in France with advantage. The

mode of preparation, recommended by Mr. M. De D., is in substance as follows:

Choose the most favorable moment to gather the Orchis, which is when the plant begins to fade, and the bulb of the preceding year almost entirely withered. About this time the bulb destined to reproduce the plant, and which is the one employed, has acquired its full growth. If sooner taken, it loses more than half its weight when dried, and the salep is of inferior quality. The same is the case if you await the maturity of the seed; from this moment the germ which bears the new bulb already begins to develope itself; vegetation is prepared for the following year, and before winter the bud is so lengthened as to be ready to shoot up from the ground.

The preparation of salep should be commenced as soon as possible after the bulbs have been pulled up. For this purpose choose the largest bulbs, clean them by separating the small roots, scrape the exterior skin, and throw them in fresh water to be washed; then string them, bead fashion, and boil in a large quantity of water, until you perceive that some of the bulbs become transformed to mucilage, which ordinarily takes place in twenty or thirty minutes. When the ebullition is not sufficiently prolonged, the salep retains a very strong and disagreeable taste. Afterwards they are dried by means of a hot sun or stove. The last is best, the action being more prompt, and the chance of fermentation removed. Mr. De D. says that the indigenous salep prepared by him was similar in appearance, and equal in quality, to the best foreign salep.

Various writers have at different times given their attention to a chemical investigation of the dried salep, but one only to the constituent principles of the recent bulb. Mr. M. De D. published an Essay in the *Annales de Chimie* as far back as 1811.

According to this author, the same principles are common to all the Orchis species. They are mostly distinguished by a peculiar, penetrating, venomous smell, which he compares to sperm, originating from a volatile oil, which may be separated by treating the fresh bulbs with alcohol. By distillation, the

alcohol passes off without any sensible odor, but developes the strong odor towards the close of the operation. By continuing the evaporation to dryness, over a gentle heat, their remains an acrid, bitter, inodorous, resinous extractive, which dissolves equally in water or alcohol, attracts moisture, and burns with much puffing, but inflaming with difficulty.

The substance of these bulbs, after being treated by alcohol, contains nothing but mucilage, mixed with a small quantity of fibrous matter. If small fragments of the fresh bulb be steeped in water, they swell up largely, become transparent, and preserve their form like gum tragacanth. Upon looking through one of these fragments, minute, slender fibres will be perceived. Suffered to remain a longer time in water, a further absorption will take place, and the whole be resolved into very thick mucilage, exhaling the peculiar venomous odor, and in which the fibrous portion will form the three or four hundredth part of the whole weight.

According to Guibourt, but in opposition to the opinions of several chemists, the recent solid tubers are composed, very nearly like all the farinaceous roots, of a large quantity of starch, which, examined with the microscope, and colored by iodine, is in uniform grains of an ethereal blue, spherical or elliptical, and about the size of the large grains of wheat starch. This starch does not contain any interior substance soluble in cold water, like wheat or potato starch, but is entirely filled with a pulpy matter, insoluble in cold, but swelling, and becoming much divided in boiling water, which, agreeably to the views of Mr. G., explains the abundance and great consistence of the jelly of salep. The rest of the root is composed of thick membranes colored yellow, very small gelatinous-like globules, transparent and colorless, and very often needle-like points, which disappear upon the slightest addition of nitric acid. These last are phosphate of lime, according to the experiments of Raspail. The prepared salep of commerce, as examined by Caventou, was found to be composed of three substances, of which the respective quantities might be cited

in this manner—*little gum, very little starch, and a great deal of bassorine.*

A discussion arose some years ago among the members of the Pharmaceutical branch of the School of Medicine, respecting the existence of fecula in salep. VAUQUELIN asserted that the tubers enclosed an abundance of it, having collected from the roots of the French Orchis some very fine starch. ROBIQUET contested this point, inasmuch as he had not succeeded in discovering a vestige of it in his experiments upon several Orchis of that country. Not being able to agree in this matter, they came to the conclusion that the same organ might contain fecula, or be totally deprived of it. This difference may have been occasioned by ROBIQUET having examined a withered tuber, but which previously contained fecula until sacrificed to the nourishment of the stalk. The same deficiency of fecula occurs in the new bulb if too young. This inconsistency proves how little this principle influences the nutritious properties of salep, and from its existing in so small a quantity when detected, we may fairly deny its claim to be ranked along with the amylaceous substances, where we generally find it in books of Materia Medica, from its having been supposed to consist of almost pure fecula.

Besides the observation of CAVENTOU, the experiments of PFAFF and others prove it to consist almost wholly of vegetable mucilage, and in nearly every respect analogous in composition with gum tragacanth. The discovery of traces of starch in some specimens of this last substance carries out the analogy still further.

Salep, by prolonged ebullition, dissolves in a transparent mucilage, and when the powder is mixed with water a similar mucilage is formed without the aid of heat, swelling and absorbing a large quantity of water.

Hydrochloric acid dissolves the mucilage, rendering it very fluid. Nitric acid converts it into oxalic acid.

GUIBOURT says that if salep be mixed with water, containing iodine, and then submitted to microscopic examination, there will be perceived some unaltered grains of fecula, con-

sisting for the greater part of teguments, swollen, torn, and gelatinized, and of a magnificent blue, indicating that the salep has not undergone a simple immersion in water, but has remained a certain time.

Desirous of ascertaining, by experiment, how far salep would comport in its chemical properties with gum tragacanth, agreeably to the best existing analysis, I made the few following experiments, the results of which confirm the supposed analogy between the two substances, and at the same time corroborate the statement of CAVENTOU.

Thirty grains of powdered salep, mixed with four fluid ounces of water, rendered it highly mucilaginous; more water was added to it, and the whole set aside in a glass vessel for a short period, when an insoluble, thick, gummous portion was deposited, which, though it increased in volume, was not dissolved by further additions of hot or cold water. The transparent liquid portion, treated by reactives, gave copious flocculent precipitates with subacetate of lead and alcohol; was rendered blue by tincture of iodine, and became clouded with oxalate of ammonia. The insoluble portion treated with boiling water, and tested with nitrate of silver and corrosive sublimate, gave slight precipitates. Iodine produced a very deep color, depositing the iodide of starch soon after.

Thirty grains of salep, boiled with four ounces of water, made a very thick, transparent jelly: cold water mixed with a portion of this jelly was rendered opalescent and mucilaginous; suffered to rest, the insoluble portion, inclosing black, fimbriated specks, (fibrous matter of DE D.,) soon fell to the bottom. Chloride of tin produced a white precipitate with the decanted viscous liquid.

One hundred grains of salep gave, by incineration, only four grains of fixed principles, composed, according to CAVENTOU, of chloride of sodium, phosphate of lime, and some traces of a sulphate. Hence, it will be perceived that salep ranks more properly among the vegetable mucilages.

Salep possesses analeptic virtues, and has been long known to the Orientals for its nourishing and restorative properties.

It is employed in the form of powder, which is boiled in water or milk to the consistence of a thick jelly, which is then sweetened and aromatized to suit the palate. It is frequently incorporated with chocolate, which increases its nutritive powers. It is perfectly innocent of the aphrodisiac virtues which have been ascribed to it, but has been found highly serviceable in chronic diarrhœa.

It is officinal in the French Codex, where a method is given for its pulverization. It directs the salep to be steeped in cold water for twenty-four hours, to be well wiped with a rough towel, to remove the cortical portion, then dried in a stove, and lastly, reduced to fine powder.

It is very little known in the United States, and its use consequently very limited. Its high price may form some objection to its employment as an alimentary substance, but could some little attention be given to the production of salep from our North American Orchis, of which there are a number, it would well repay the time and labor bestowed upon it.

SELECTED ARTICLES.

ART. VI.—REMARKS ON SEVERAL OF THE FORMULÆ OF THE UNITED STATES PHARMACOPŒIA.

By DAVID STEWART, Pharmaceutist, Baltimore.

SINCE the last revision of the United States Pharmacopœia, there has not, perhaps, occurred a theory which will have a more important influence in improving its formulæ, than that of the application of the displacement process to the preparations of tinctures, aqueous solutions, extracts, &c. I was first struck with its utility during the formation of a solution of opium, about two years since, in order to the preparation of morphia,—and, as the simple means used on this occasion may be substituted for the filter and screw press, in the separation of all the tincture from the dregs of opium in the preparation of tinct. opii, without the presence of that gelatinous precipitate which always accompanies the use of the latter, I will recommend it to those who wish to economise in this and other preparations.

Bind together the long and short legs of two glass syphons with a narrow strip of flannel, at a point from which they will nearly reach to the bottom of the demijohn, or vessel containing the tincture—continue the operation until, upon the introduction of the tubes, the mouth will be obstructed by the flannel,—invert the demijohn and suffer the tincture to filter through the coil of flannel, until all of it has escaped except that which is retained by capillary attraction in the dregs. Then insert a small funnel into the long foot of the syphon, outside of the demijohn, and introduce into the demijohn a quantity of water sufficient to displace the remainder of the tincture.

Thus an amount of tincture can be obtained equal to the spirit used in its preparation. This will be considered quite a desideratum in the preparation of the vinum rad. colchici of the United States Pharmacopœia, where the proportion of root ordered is so great, that nearly all the wine is absorbed; but in adapting the process to this, and some other preparations, I would recommend that the water used in displacing should be charged with about one-fifth its measure of alcohol, in order to prevent it from reviving the mucilage with which the root abounds.

Decoctum Sarsaparillæ Comp. The officinal formula for this preparation is a very imperfect one, as the product is always charged with inert oxidised extractive matter and fecula to such a degree that it is impossible for any one to use it for any length of time, if at all. While conversing upon this subject, about two years since, with one of our most eminent medical men, and comparing the value of the several preparations of sarsaparilla, I was struck with the decided preference he gave to the diet drink, if it could be prepared in the form of ptisan, and determined to apply the principles of the above process to its preparation. My success was far beyond my anticipations, as the result was a concentrated solution of all that is valuable in the ingredients, free from fecula, and the extractive matter is apparently free from the disposition to oxidise, as it could be reduced to a soluble extract. As I communicated my ideas upon this subject to one of our most skilful pharmaceutists at the time, and the experience of two years has confirmed our impressions as to the superiority of this process, I will give it in detail, and refer to an article which has since appeared in the American Journal of Pharmacy, Vol. X. page 10, where a number of experiments are recorded, confirming the above statement.

I am in the habit of using a small tin funnel, the bowl of which does not exceed four inches in diameter, to which is soldered a cylinder or cone of tin, eleven inches long, and five and a half inches wide at the top—into the neck of this is introduced a small willow cap, such as generally cover the

mouths of demijohns, which is sometimes enveloped with a small piece of flannel, to prevent the finer particles from passing through. The ingredients, after having been well bruised, are introduced and kept in their place by a perforated earthen sphere or plate, such as generally accompany infusion pitchers. A quantity of water, equal to the desired product, at about the temperature of 180°, is now passed through the ingredients, and the operation is repeated until it appears saturated; upon which it is set aside, and another portion of hot water used in like manner, until the product is but slightly colored. The displaced liquids are now evaporated in a well tinned copper dish to the quantity indicated.

I have been thus minute in describing the peculiarities of this apparatus, as we have found it well adapted to the preparation of mel scillæ c., syr. sarsæ., syr. rhei et sennæ, syr. rhei, &c. After several years experience in the preparation of the last mentioned syrups, according to the improved formula which I have published in the fifth volume of the Journal of Pharmacy, page 33, I would confidently recommend it as a substitute for that of the Pharmacopœia, as it is not apt to ferment, and the spirit used as a solvent for the rhubarb, &c., is evaporated.

Acidum Hydrocyanicum. The presence of a small quantity of cyanuret of mercury seems to be necessary to the preservation of the acid hydrocyanic of the Pharmacopœia, as I have discovered that when solution of the cyanuret of mercury is super-saturated with sulphuretted hydrogen, it commences to precipitate carbon a few hours after its separation from the sulphuret of mercury. After much experience in its preparation, according to the above process, I have resorted to the process of Gay Lussac, described in the Dublin Pharmacopœia, using half the amount of water ordered, and diluting the product with alcohol, to form a solution equal in strength to the officinal formula. No change has ever been discovered in this preparation.

Maryland Med. and Surg. Journ. Jan., 1840.

ART. VII.—OBSERVATIONS TOWARDS THE STUDY OF TARTARIC ACID. By MM. E. Soubeiran and H. Capitaine.

The curious observation of Dumas and Liebig, of the property possessed by tartar emetic, of losing, when exposed to an elevated temperature, two equivalents of water more than is lost by the other tartrates, gives some importance to experiments made with a view of ascertaining whether the same character appertained to the other tartrates having a similarity in composition. It might be expected to receive from these some light as to the real composition of tartaric acid, which the principal experiments of the two experienced chemists have left totally in doubt.

Tartrate of Iron and Potassa.

Our first attempts were made with the tartrate of iron and potassa, a salt but little understood at present, and whose chemical history is not without interest. We are acquainted with only one analysis of the double tartrate of sesquioxide of iron and potassa, that of Mr. Philips, who found that two atoms of tartaric acid were united with one atom of potassa, and one-half an atom of sesquioxide of iron; and that the oxygen of this latter was to that of the potassa as 1.5 to 1. From our experiments it will be seen that Mr. Philips employed a salt which was not saturated with the sesquioxide of iron.

To prepare the tartrate of iron and potassa, pure bitartrate of potassa, and equally pure hydrated sesquioxide of iron, must be mixed together in water, and digested at the temperature of 50° to 60° c., for twenty-four to thirty-six hours, shaking the mixture occasionally; the excess of hydrate is then to be separated by the filter, and the liquor evaporated to dryness by a low heat. A salt will then be obtained under the form of brilliant scales, of a brown or nearly black color, but of a ruby red, when placed between the eye and the light.

To analyse this salt, after it had been pulverized and dried

at the temperature of 100° c., in the apparatus of M. Liebig, until it ceased to lose weight, it was decomposed by heat, and the potassa estimated in the state of sulphate, and the iron as sesquioxide. For this purpose, a known weight of the salt was carefully calcined, the product was mixed with water, and super-saturated with sulphuric acid; a small excess of carbonate of ammonia was then added, and the liquor filtered and evaporated to obtain the weight of the sulphate of potassa. The proportion of the sesquioxide of iron was found by burning the filter on which it had been collected, washing the ashes with nitric acid, and heating anew to redness. The proportion of the tartaric acid was given by the difference between the weight of the matter employed, and the weights of the potassa and oxide of iron obtained.

I. 3gr,355 of the salt dried at 100° c., gave—
Sesquioxide of iron, 1.044 or 31.11 p. 100
Sulphate of potassa 1.178, or potassa, 0.637 or 18.98 p. 100
II. 3gr,017 of the same furnished—
Sesquioxide of iron, 0.920 or 30.49 p. 100
Sulphate of potassa 1.018, or potassa, 0.550 or 18.23 p. 100

These analytic results correspond to the following composition:

1 atom sesquioxide of iron, Fe^2O^3	= 978.41 or	30.29
1 atom potassa, KO,	= 589.92 or	18.26
1 atom tartaric acid, $C^8H^6O^{10}$,	=1661.42 or	51.45
	3229.75	100.00

A composition similar to that of tartar emetic deprived of its water of crystallization; the oxide of antimony being replaced by an oxide of iron.

Our experiments to determine the quantity of water which the tartrate of iron and potassa would lose at a temperature exceeding 100° c., did not give the desired result, but made known to us a remarkable property of this salt. When heated at a temperature not exceeding 130° c., the oxide of iron

is reduced, and water and carbonic acid extricated. If we now endeavor to dissolve the salt in water, a quantity of black ferruginous matter will subside, corresponding in amount to the portion of the salt decomposed.

This easy decomposition of the tartrate of iron and potassa, renders it unsuitable to elucidate the question which we have proposed, but it gives us the key to a fact which is known to those who have managed this salt, and which has hitherto remained unexplained, namely: that when evaporated by a naked fire it often happens that the dried salt refuses to dissolve in water. This results from the elevation of temperature during the drying, being sufficient to produce a partial deoxidisement of the iron.

This ready reduction of the oxide of iron in the tartrate of iron and potassa, appears the more remarkable to us in another experiment, by which we endeavored to produce a double tartrate, in which the oxygen should be in the same quantity in the potassa and in the oxide of iron, or even in a double quantity in this latter. For this purpose we kept at a boiling temperature, in two different mattrasses, the bitartrate of potassa, and the hydrated sesquioxide of iron in the quantities proper to produce these results. At first, the liquid was highly colored on taking up the iron, but all at once it became colorless, and at the same time a deposit, nearly colorless, appeared at the bottom of the vessel. This sediment was tartrate of iron; it resulted from the partial reduction of the sesquioxide of iron by the elements of the tartaric acid. We have produced the same result by boiling a mixture of cream of tartar and tartrate of iron and potassa, and even by boiling a solution of this latter salt, when perfectly pure. It may now be readily seen why we have recommended, in the preparation of this tartrate, that the temperature should be between 50° and 60° c., and how, with an excess of hydrate of the sesquioxide of iron, solutions might be obtained which were not saturated with the iron. This is probably what happened to Mr. Philips; it is what we have observed when this property was not yet known to us in our first experiments,

when each operation gave to us salts of different compositions.

Tartrate of Boron and Potassa.

The tartrate of boron and potassa, (soluble cream of tartar,) when perfectly saturated with boracic acid, has a composition corresponding to that of tartar emetic, and of the tartrate of iron and potassa dried at 100° c. The oxygen of the boracic acid is three times the oxygen of the potassa. But as we can have but little fear that a ready reduction of the boracic acid should confine our experiments, we have examined whether the soluble cream of tartar is affected by heat in the same manner as tartar emetic. We soon ascertained that we could raise the temperature to 285° c. without producing any change. It remained, after this experiment, equally as soluble in water as previous to the action of the heat.

First Experiment.

5gr,642 of soluble cream of tartar dried at 100° c., and afterwards heated to 280°, lost—

Water, 0.464 gr., or 8.227 p. 100.

Second Experiment.

3gr,535 of another specimen lost—

Water, 0.285 gr., or 8.06 p. 100.

Third Experiment.

2gr,872 of a third specimen lost—

Water, 0.230 gr., or 8.008 p. 100.

Admitting that the loss for soluble cream of tartar ought to be, as for tartar emetic, of two equivalents of water, the theoretic loss should be 8.37 p. 100, and the soluble cream of tartar under these circumstances may be fully assimilated with tartar emetic.

We would willingly avail ourselves of other information from analogous tartrates. It would be a matter of curiosity

to ascertain the manner of action of the simple tartrate of antimony. But we have not been able to obtain this salt in a pure state. The processes stated in the works on chemistry, do not conduce to this end. That by which we have succeeded best, is to saturate a solution of tartaric acid with oxide of antimony, to concentrate and precipitate by strong alcohol. But in this case there is certainly a mixture of salts in different states of saturation, and at each operation there was disclosed, by analysis, different quantities of oxide of antimony. We have, it is true, proven that this salt, dried at 100° c., looses an additional quantity of water when raised to the temperature of 250° c.; but, having under trial a mixed product, we deemed it useless to determine the precise quantity lost.

The loss of two atoms of water, which tartar emetic undergoes when heated to 250°, has necessarily led the chemists who have observed this, to the consideration whether it does not contain the acid $C^8H^8O^{10}$. It is desirable to know whence the water, which separates at that temperature, is derived. M. Liebig has given two hypotheses; one, that the water is contained ready formed in the tartaric acid, and is separated at the temperature of 250° c.; in the other, that a part of the oxide of antimony is reduced, forming with the hydrogen of the acid, the water yielded in the experiment. M. Liebig prefers this latter, the partial reduction of the oxide of antimony, and he concludes that we can no longer consider as hypothetical, the true presence of a base contained in the metallic state, in combination with an oxygenated acid.

This partial reduction of the oxide of antimony, in which two-thirds of the antimony enters as a metal into combination, while the other third remains in the state of oxide, does not appear to have great probability. Experiment is not favorable to it; for if we accomplish the decomposition of tartar emetic, or of soluble cream of tartar with care, and so as only to carbonize the organic matter, we find, it is true, in the residue, metallic antimony perhaps, which will not dissolve in weak acids, but in the carbonaceous residue furnished by the

soluble cream of tartar, it is impossible to discover any trace of boron, because this body offers greater obstacles to reduction than the oxide of antimony.

M. Liebig considers the formation of oxalic acid, and hydrated acetic acid, during the decomposition of a tartrate by an excess of caustic potassa, as a conclusive argument against the pre-existence of two atoms of water which separate from the tartar emetic. "If we admit," says M. Liebig, "that tartaric acid contains, already formed, two atoms of water, we are led to admit, likewise, that acetic acid, considered as anhydrous, either contains one atom of water, or is formed by the addition of one atom of water, which passes to a state from which it can no longer be eliminated by bases."

We can see that the difficulty with M. Liebig is to admit that the elements of water, existing as water in tartaric acid, can, in passing to acetic acid, assume another chemical relation. This, however, can no longer appear astonishing amidst so powerful an atomic reaction as that which conduces to the conversion of tartaric into two other different acids.

We would only desire to render it evident that the theoretical reduction of the oxide of antimony, and also of the boracic acid, is not absolutely necessary to the explanation of the facts.

We can in a manner equally simple and easy, represent the composition of tartaric acid, and of the tartrates, by adopting for the equivalent of the acid, the formula $C^8H^4O^8$, and admitting that this acid always unites with four equivalents of base, water, or metallic oxide, two of these equivalents being more strongly retained than the others.

Representing tartaric acid by $C^8H^4O^8$ by T, the tartrates will have the following composition:

T+2HO+HOHO=crystallised tartaric acid.
T+2HO+HOKO=cream of tartar.
T+2HO+KOKO=neutral tartrate of potassa.
T+2HO+KONaO=Rochelle salt.
T+2HO+PbOPbO=tartrate of lead.

The subsalts known will be the following:

$T+2HO+KOSb^2O^3$=tartar emetic dried at 100° c.
$T+2HO+KOF^2O^3$=tartrate of iron and potassa.
$T+2HO+KOBO^3$=soluble cream of tartar.

When these basic salts, after being dried at 100° c., are heated still higher, the basic water is displaced; but except, as to the excess of base, the composition of the tartrates remains unaltered. We can then explain why the basic tartrates are the only ones which lose two atoms of water by heat; the other not containing the base to be liberated. This theory, any more than the other, cannot be considered as a true expression of the phenomena; it has at least the advantage of satisfying, in a simple manner, the chemical data of experiments which belong to tartaric acid and the tartrates.

In the course of our researches we desired to obtain, by the direct action of cream of tartar on oxide of antimony, the basic salt, which chemists have supposed to exist in the mother waters of tartar emetic. The following are the results:

We kept boiling in a mattrass, for forty hours, one equivalent of pure cream of tartar, (24.64 grammes,) and two equivalents of oxide of antimony (38.24 grammes) in 400 grammes of water. One-half only of the oxide of antimony was dissolved, and the liquid afforded, to the very last, common tartar emetic.

We have not as yet been more successful in producing a tartrate of antimony and potassa not basic. The liquid has always yielded separate crystals of cream of tartar and of tartar emetic. *Journ. de Pharm.*

ART. VIII.—ON THE BORACIC ACID LAGOONS OF TUSCANY. By John Bowring, LL. D.*

The borax lagoons of Tuscany are entitled to a detailed description. They are unique in Europe, if not in the world; and their produce is become an article of equal importance to Great Britain as an import, and to Tuscany as an export. They are spread over a surface of about thirty miles, and exhibit, from the distance, columns of vapor, more or less according to the seasons of the year and state of the weather, which rise in large volumes among the recesses of the mountains.

As you approach the lagoons, the earth seems to pour out boiling water, as if from volcanoes of various sizes, in a variety of soil, but principally in chalk and sand. The heat in the immediate adjacency is intolerable, and you are drenched by the vapor, which impregnates the atmosphere with a strong and somewhat sulphurous smell. The whole scene is one of terrible violence and confusion—the noisy outbreak of the boiling element—the rugged and agitated surface—the volumes of vapor—the impregnated atmosphere—the rush of waters—among bleak and solitary mountains.

The ground, which burns and shakes beneath your feet, is covered with beautiful crystallizations of sulphur and other minerals. Its character, beneath the surface, at Mont Cerbole, is that of a black marl streaked with chalk, giving it, at a short distance, the appearance of variegated marble.

Formerly, the place was regarded by the peasants as the entrance to hell, a superstition derived, no doubt, from very ancient times, for the principal of the lagoons, and the neighboring volcano, still bear the name of Mont Cerboli, (Mons Ceberi.) The peasantry never passed by the spot without terror, counting their beads, and praying for the protection of the Virgin.

* From Dr. Bowring's Report on the Statistics of Tuscany.

The borax lagoons have been brought to their present profitable action within a few years. Scattered over an extensive district, they are become the property of an active individual, M. Larderel, to whom they are a source of wealth, more valuable perhaps, and certainly less capricious, than any mine of silver that Mexico or Peru possesses. The process of manufacture is simple, and is effected by those instruments which the localities themselves present. The soffioni, or vapors, break violently forth in different parts of the mountain recesses. They only produce boracic acid when they burst with a fierce explosion. In these spots artificial lagoons are formed by the introduction of the mountain streams. The hot vapor keeps the water perpetually in boiling ebullition ; and after it has received its impregnation during twenty-four hours at the most elevated lagoon, the contents are allowed to descend to the second lagoon, where a second impregnation takes place, and then to a third, and so forth, till it reaches the lowest receptacle ; and having thus passed through from six to eight lagoons, it has gathered one-half per cent. of the boracic acid. It is then transferred to the reservoirs, from whence, after a few hours rest, it is conveyed to the evaporating pans, where the hot vapor concentrates the strength of the acid by passing under shallow leaden vessels from the boiling fountains above, which is quite at a heat of 80°R.,* and is discharged at a heat of 60°.† There are from ten to twenty pans, in each of which the concentration becomes greater at every descent, till it passes to the crystallizing vessels, from whence it is carried to the drying rooms, where, after two or three hours, it becomes ready to be packed for exportation.

The number of establishments is nine.‡ The whole amount produced varies from 7000 to 8000 pounds (of 12 ounces) per day. The produce does not appear susceptible of much extension, as the whole of the water is turned to account ; the

*The boiling point. †167° Farenheit.

‡The principal are Monte Cerboli, Monte Rotondo, Susso, Serazzano, and Castelnuovo.

atmosphere has, however, some influence on the result. In bright clear weather, whether in winter or summer, the vapors are less dense, but the deposition of boracic acid in the lagoons is greater. Increased vapors indicate unfavorable change of weather, and the lagoons are infallible barometers to the neighborhood, even at a great distance, serving to regulate the proceedings of the peasantry in their agriculture pursuits.

It has been long supposed that the boracic acid was not to be found in the vapors of the lagoons; and when it is seen how small the proportion of the acid must originally be, it will not be wondered at, that its presence should have escaped detection. In the lowest of the lagoons, after five, six, and in some cases a greater number of impregnations, the quantity of boracic acid given out does not exceed one-half per cent.; thus, if the produce be estimated at 7500 pounds per day, the quantity of saturated water daily discharged is a million and a half of Tuscan pounds, or five hundred tons English.

The lagoons are ordinarily excavated by the mountaineers of Lombardy, who emigrate into Tuscany during the winter season when their native Appenines are covered with snow. They gain about one Tuscan lira per day. But the works are conducted, when in operation, by natives, all of whom are married, and who occupy houses attached to the evaporating pans. They wear a common uniform, and their health is generally good.

A great improvement in the cultivation, and a great increase in the value of the neighboring soil has naturally followed the introduction of the manufacture of the boracic acid. A rise of wages has accompanied the new demand for labor; much land has been brought into cultivation by new directions given to the streams of smaller rivers. Before the boracic acid lakes were turned to profitable account, their fetid smell—their frightful appearance, agitating the earth around them by the ceaseless explosions of boiling water, and not less the terrors which superstition invested them,* made the lagoons them-

* So unwilling were the peasants to settle in these districts, that very extraordinary encouragements were held out to them. In the commune

selves to be regarded as a public nuisance, and gave to the surrounding country a character which alienated all attempts at improvement.

Nor were the lagoons without real and positive dangers, for the loss of life was certain where a man or beast had the misfortune to fall into any of these boiling baths. Cases frequently occurred in which cattle perished; and one chemist of considerable eminence, met with a horrible death by being precipitated into one of the lagoons. Legs were not unfrequently lost by a false step into the smaller pits, (putezzi,) where, before the foot could be withdrawn the flesh would be separated from the bone.

That these lagoons, now a source of immense revenue, should have remained for ages unproductive; that they should have been so frequently visited by scientific men, to none of whom (for ages at least) did the thought occur, that they contained in them mines of wealth, is a curious phenomenon; nor is it less remarkable, that it was left for a man, whose name and occupation are wholly disassociated from science, to convert these fugitive vapors into substantial wealth.

Though to the present proprietor (the Chevalier Larderel*) the merit attaches of having given to the boracic lagoons the

of Monte Cerboli any inhabitant of the town may sow and reap whatever he pleases, without requiring the consent of the owner of the soil; so it frequently happens that small tracts are cultivated which are particularly favored by water or other advantages, and all the surrounding land left untouched. As the inhabitants have the primary right, the landlord generally abandons his property to the chance cultivation of the peasant who leaves fallow nine-tenths of the land. In the district of Riparbella the landlords and cultivators have come to a sensible agreement by apportioning the lands in equal moieties.

Many mineral waters are in the neighborhood of the lagoons, some of which possess medical virtues, and are visited by the Tuscans in the bathing season.

* While these sheets have been passing through the press, the Grand Duke of Tuscany has conferred on M. Larderel the title of Count de Pomerance.

great importance they now possess, a succession of adventurers had made many experiments, and had produced a considerable quantity of boracic acid, but at a cost (from the expenditure of combustible) which left little profit.* The small value which was attached to them may be seen in the fact, that the largest and most productive district of the lagoons, that of Monte Cerboli, was offered in perpetuity, so lately as 1818, at an annual ground rent of £6. 13*s.* 4*d.* per annum, though it now produces several thousand pounds sterling. The immense increase in their value arose from the simplest of improvements, the abandonment of the use of charcoal, and the application of the heat of the lagoons, or soffioni to the evaporation of their own waters. Improvements, however, and very important ones, particularly by subjecting the waters to a succession of impregnations, had been gradually introduced by a Signor Ciaschi, and the importation of boracic acid from Tuscany into France, before 1817, had been between 7000 and 8000 pounds, of a quality gradually increasing in purity; but Ciaschi perished miserably, in consequence of falling into one of the lagoons which he himself had excavated, leaving his family in a state of extreme poverty. His death (which happened in 1816) naturally threw a damp upon adventure. The experiments were resumed in the following year, and in the midst of violent claims and controversies, M. Larderel has become the monopolist of the boracic productions of Tuscany.

With the increased production of boracic acid, has arisen an increased demand, growing out of the more extensive applications of it to manufacturing purposes. In about four years, the quantity has been quadrupled by superior modes of extraction, and by greater care employed in collecting the boracic vapor. In 1833, about 650,000 Tuscan pounds were obtained. In 1836, two millions and a half.

* Hoefer first announced the presence of boracic acid in the Maremman districts, and Mascagni in his commentaries suggests the manufacture of borax as an object worthy of attention. Professor Gazzeri, in 1807, made experiments, which, however, seemed to show the quantity of boracic acid contained in the waters was too small to promise much success.

But it appears to me that the powers and riches of these extraordinary districts remain yet to be fully developed. They exhibit a great number of mighty steam engines, furnished by nature at no cost, and applicable to an infinite variety of objects. In the progress of time this vast machinery of heat and force will probably become the moving central point of extensive manufacturing establishments. The steam, which has been so ingeniously applied to the concentration and evaporation of the boracic acid, will probably hereafter, instead of wasting itself in the air, be employed to move huge engines, which will be directed to the infinite variety of productions which engage the attention of laboring and intelligent artizans; and thus, in the course of time, there can be little doubt that these lagoons, which were fled from as objects of danger and terror by uninstructed man, will gather round them a large and intelligent population, and become sources of prosperity to innumerable individuals, through countless generations. *Edin. New Phil. Journ.*

ART. IX.—THEORY OF THE AMIDETS. By M. J. Dumas.

The analysis of oxamide having disclosed that this substance contains—

2	atoms of	Carbon,
2	"	Oxygen,
1	"	Nitrogen,
2	"	Hydrogen,

and the examination of these reactions having proven that it is changed into oxalate of ammonia, or into oxalic acid and ammonia, under the operation of a large number of influences, there results from hence a theory which may readily be applied to many analogous compounds.

It may be conceived that oxamide may be represented by

two binary compounds, the oxide of carbon, and a peculiar nitruret of hydrogen,* containing less hydrogen than ammonia, and which has not as yet been obtained in a separate state. Oxamide then may be written with this formula—

$$C^2O^2+NH^2.$$

Of the two compounds it is necessary to inquire which plays the negative part, and we come easily to the result by the following considerations: It is known, that in general when any body decomposes water, it separates the hydrogen by means of its negative element, and the oxygen by its positive element. But since oxamide in passing to the state of oxalate of ammonia, decomposes water, it would appear that the nitruret of hydrogen, which separates the hydrogen should be the negative element, and the oxide of carbon which unites with the oxygen would play the positive part in the compound.

The reasoning which we have set forth with regard to oxamide, may be applied to urea, which, in fact, contains—

2	atoms of	Carbon,
2	"	Oxygen,
2	"	Nitrogen,
4	"	Hydrogen.

It acts in every respect like oxamide, and is changed into carbonate of ammonia, or rather into carbonic acid and ammonia, by the decomposition of water under the operation of numerous influences. Its formula, decomposed according to these considerations, would become—

$$C^2O^2+N^2H^4.$$

Here again appears the oxide of carbon and the nitruret of hydrogen already recognised in the oxamide. Here likewise, for the same considerations, it is the oxide of carbon which

* To this hypothetical compound the name amidogene has been applied.

plays the positive and the nitruret of hydrogen which performs the negative part in the compound.

We may then admit, as almost an expression of fact, the principles from which are derived the explanation of the characters of oxamide and urea. But the attentive examination of these characters will lead to a more elevated view, which gives to the theory of the amidets a very great amount of interest.

Admit, for a moment, that ammonia, by reason of its hydrogenous nature, may act as a hydrobase, in the same manner as of an acid in the hydracids, and that it may loose the whole or part of its hydrogen by forming water, it then becomes easy to conceive how, by the action of heat, the oxalate of ammonia is changed into oxamide; this reaction bearing a strong resemblance to that by which is explained the conversion of a hydrochlorate into a chloride. In fact we have—

$$C^2O^3+NH^3=C^2O^2+NH^2+HO.$$

It is likewise easy to comprehend the reproduction of oxalate of ammonia, or of oxalic acid and ammonia from oxamide, when examined from the same point of view. For under the influence of water only, with an elevated temperature, oxamide is converted into oxalate of ammonia.

The acids determine the formation of ammonia and set oxalic acid free.

The bases produce the same reaction, with a disengagement of ammonia.

Thus, oxamide acts as a chloride, which, containing neither acid or metallic base, nevertheless gives rise to hydrochloric acid and an oxide under similar influences.

It therefore appears rational to consider oxamide as a body analogous to the chlorides in which the oxide of carbon plays the part of a metal, and the nitruret of hydrogen the part of chlorine. By calling this nitruret of hydrogen by the name of *amide*, we will have under this view—

Amidet of oxide of carbon, or oxamide, $=C^2O^2+NH^2$.
Bi-amidet of oxide of carbon, or urea, $=C^2O^2+N^2H^4$.

If this new view were confined merely to the expressing in a more simple manner the facts which we have pointed out above, it would scarcely require any further attention; but if it leads us to forsee the better, to classify the better, to explain the better, numerous reactions, it then becomes necessary to allot it a place among the provisional theories of organic chemistry. To verify the exactness of the theory, it is proper to examine the facts concerning the negative, and the positive bodies which we suppose to exist in oxamide, as well as this substance itself, and to see not only whether any thing opposes the resemblance, but also if the facts could be foretold by an incontestible analogy.

We remark at once, that if ammonia acts similarly to an hydracid, although in an inverse sense, it should act, like them, with regard to the metals, since on loosing hydrogen, the remaining elements form an electro-negative body. Thus, by heating potassium or sodium, for example, with ammonia, it should form amidets of these metals, of which we could predict the composition and characteristic properties. These amidets should be produced according to the following formula:

$$N^2H^6+K=H^2+K,\ N^2H^4.$$
$$N^2H^6+Na=H^2+Na,\ N^2H^4.$$

In other words, by acting on ammonia, the potassium and the sodium should furnish two volumes of hydrogen in decomposing four volumes of ammonia. Thus the above metals, by acting on ammonia, should liberate the same quantity of hydrogen as if they acted on water. This is precisely the result at which MM. Gay Lussac and Thenard arrived in their numerous experiments on this subject.

But they did not always observe a disappearance of ammonia equal to a volume double to that of the hydrogen formed. Their experiments never gave for four volumes of hydrogen disengaged, more than seven volumes of ammonia decomposed. It is therefore necessary to recur to new trials to verify it under this point of view.

Besides, as that which we now regard as an amidet of potassium is changed by heat into a nitruret of potassium and ammonia, and as the nitruret itself is changed into ammonia and potassium by the action of water, it is proper to examine whether these two facts can be explained. We have, in fact,—

$$K^3, N^3H^6 = K^3N + N^3H^6.$$
$$K^3, N + H^3O^3 = K^3O^3 + NH^3.$$

The first formula represents the action of heat upon the amidet of potassium; the second that of water on the nitruret, which thereby results. The first of these formulæ shows how difficult it is to form the amidet, without producing some nitruret; and it explains to us the difference cited above, between the formulæ and the experiments of MM. Gay Lussac and Thenard.

It is possible that the substances, at present called chloride of nitrogen, iodide of nitrogen, &c., may be only chloride and iodide of amide, &c.

The oxide of carbon may in its turn be considered as a radical, as I have proposed long since. On this supposition, the chloroxi-carbonic acid will be a chloride of oxide of carbon, and carbonic and oxalic acid will be the oxides.

The formulæ of oxalic and carbonic acids may be written in the following form:

Oxide of Carbon,	CO.
Oxalic Acid,	$2CO + O$.
Carbonic Acid,	$CO + O$.

That of chloroxi-carbonic acid will be $CO + Cl$.

To return to oxamide and urea, we now can better understand their nature; for urea becomes analogous to chloroxi-carbonic acid, and oxamide to a combination $C^2O^2 + Cl$. In fact, the action of these different compounds on water produced identical results.

$$(CO+Cl)+HO=ClH+(CO+O.)$$
$$(C^2O^2+Cl)+HO=ClH+(C^2O^2+O.)$$
$$(C^2O^2+NH^2)+HO=NH^3+(C^2O^2+O.)$$
$$(C^2O^2+N^2H^4)+H^2O^2=N^2H^6+(C^2O^2+O^2.)$$

Finally, in oxamide and in urea do we find characters which belong to the chlorides, that is to say, the power of combining with compounds of the same order as themselves, and of a neutral nature. To be convinced that it is so, it suffices to examine the following formula:

Oxamethane, $(C^2O^2, NH^2)+(C^2O^3H^4C^4, HO.)$
Oxamide. Oxalic Ether.

Urethane, $(C^2O^2, N^2H^4)+(C^2O^4, H^5C^8, H^2O^2.)$
Urea. Carbonic Ether.

It is evident, according to these formulæ, these combinations correspond to those which common salt forms with the sugar of raisins or diabetes.

Thus, without pretending that these different examples are interpreted in a manner conformable to truth, we may say that if we admit an electro-negative body, NH^2, in the amidets, we attain to an explanation of a great number of facts, without going out of the ordinary circle of chemical conceptions, and that with a little reflection we may be led to foresee the existence of a great number of new combinations.

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ART. X.—ON THE STRONG DECOCTION OF ZITTMAN.

By A. Wiggers.

This remedy has been several times, as is known, the object of chemical investigation; sometimes mercury has been detected, and at others has not been found in it. The insolubility of the mercurial preparations employed in its preparation, (calomel and cinnabar,) appear to have rendered this last result most probable. Their addition has even been regarded as absurd, and they have accordingly been excluded from the preparation.

To determine whether this decoction does or does not contain mercury in solution, M. Wiggers has made the following experiment:

He prepared it according to the last Prussian Pharmacopœia, which is generally followed in Germany in obtaining this medicine. The ebullition was accomplished in a glass matrass. By filtering the liquid through a triple filter of thick paper, he obtained it so clear that it was not possible to admit the presence of any mercurial combination by means of mechanical suspension. He mixed four pounds of this decoction with a proportionate quantity of nitric acid, then he boiled the mixture until reduced to near two ounces; he continued the ebullition with the residue by frequently adding nitric acid, until the acid exhibited no more action and he had destroyed, as far as possible, the organic matters. After the evaporation had been pushed as far as could be done, he endeavored, by the reiterated addition of hydrochloric acid, and elevation of temperature, to decompose and drive off all the nitric acid. He finally diluted the mass with water, filtered and saturated it with sulphuretted hydrogen. He thus obtained a light, brownish-yellow precipitate. When this precipitate was collected and washed, boiling nitric acid appeared to have little action upon it, but it was immediately dissolved by the addition of a small quantity of hydrochloric acid, by allowing the separation of a little sulphur. All the

nitric acid contained in the solution was dissipated and destroyed by ebullition and repeated additions of hydrochloric acid. The liquid thus obtained was perfectly clear and colorless; evaporated to a small residuum, and chloride of tin being added, it gave a grayish-black cloud, which was condensed by heat and the addition of a little alcohol into globules of metallic mercury, so easy of recognition, that doubt no longer remained with respect to the presence of mercury in solution in this decoction. But the quantity was too small to be able to appreciate it correctly. M. Wiggers estimates it approximatively at one-half a millogramme to the four pounds of decoction. The quantity of mercurial combinations which are active, when this decoction is employed, is certainly greater, not, however, in a state of solution, but in that of simple suspension, as it is directed not to filter it, but to simply pour it off; in fact, the little bag, in which the calomel and cinnabar ought to be suspended in the liquid during ebullition, allows a large quantity of these bodies to escape, which finally pass through the linen serving as a filter.

The small quantity of mercury in solution does not permit of determining exactly under what form it exists. The cinnabar, a body completely insoluble in water, and which does not undergo any decomposition under the circumstances which attend the preparation of this decoction, appears not to be the cause of the solution of the mercury; but we may suppose, according to M. Wiggers, that the calomel is decomposed by a catalytic action into metallic mercury and corrosive sublimate, a decomposition which is brought about in it, as is known, by many bodies. In this case the mercury may be found dissolved in the decoction, partly in the state of sublimate, and partly in the metallic state, under the form of gas; and M. Wiggers believes this proposition more likely than the opinion of Catel, who thinks that the mercury becomes oxydised, and is dissolved under the form of the acid sulphate of the deutoxide of mercury, by means of the sulphuric acid of the alum which is added.

After having thus proved, beyond doubt, the actual solu-

tion of mercury in Zittman's decoction, M. Wiggers re-renews the judicious proposition of Catel, of not preparing this medicine in any metallic vessel, of tin, copper, brass, or iron, as is often done, but to employ for this purpose glass, porcelain, or stone-ware, otherwise the mercury would precipitate on the metallic vessel. A. G. V.

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ART. XI.—ON THE EMPLOYMENT OF A NEW VEGETABLE, MONESIA, IN MEDICINE. By Dr. G. Martin St. Ange.

A VEGETABLE substance, called *monesia*, has lately been imported from South America, in the form of hard thick cakes, weighing about five hundred grammes, (8215 grains.) These loaves, which are flattened, and have paper, of a yellow color, adhering to them, are composed of the extract, prepared in the country, from the bark of a tree, whose botanical name is not known. M. Bernard Derosne, the druggist who introduced it, informs me that some travellers call the monesia bark *goharem;* and others, *buranhem.* But what is of more importance, is, that the naturalists who have examined it, think that the tree which furnishes it, is a chrysophyllum.

The extract is of a deep brown, and very friable; when broken, it looks like a well roasted cocoa-nut. It is entirely soluble in water; and its taste, which is at first sugary, like liquorice, soon becomes astringent, and leaves behind a well marked and lasting acid taste, which is particularly felt in the tonsils.

The bark of the monesia is smooth and grayish, like that of the plane tree, with this difference, however, that it is much thicker; that its fracture is imbricated, and that its sweet taste forms a strong contrast with the bitterness of the thin laminæ which are detached from the plane.

The chemical analysis of the bark of the monesia, and of

the imported extract, according to MM. Bernard Derosne and O. Henry, has demonstrated the presence of the following soluble principles:—1, chlorophylle; 2, vegetable wax; 3, a fatty and crystallizable matter; 4, glycyrrhizine; 5, an acrid and somewhat bitter substance; 6, a little tannin; 7, an unexamined organic acid; 8, a red coloring matter, resembling that of cinchona; 9, phosphates of lime, with organic acids.

The pharmaceutical preparations which have been made with this substance are—1, an aqueous extract; 2, a syrup, containing thirty centigrammes, (5½ grains) in the ounce; 3, a hydro-alcoholic tincture, containing two grammes (37 grains) per ounce; 4, chocolate, containing thirty centigrammes (5½ grains) in each cake, weighing three decagrammes (7 drachms, 49 grains;) 5, an ointment, containing an eighth part of its weight of extract; 6, monesine, being the acrid substance mentioned in the analysis.

The extract contains about eight per cent. of glycyrrhizine, and twenty per cent. of acrid matter.

The following accounts of monesia are already in existence: 1. A manuscript memoir, which is in the hands of the commissioners appointed by the Academy of Medicine. 2. A synoptical table, giving the analysis, some pharmaceutical preparations, and the medicinal preparations, of monesia. 3. A very minute summary of these two papers, entitled, "Account of Monesia." 4. An article inserted in the *Bulletin Thérapeutique.*

I will now give a succinct account of the facts which have been published, before mentioning the results which I have obtained, myself.

The medical cases in the synoptic table have been drawn up by several physicians in Paris; they give the nature of the disease, the sex, the profession, the age, and the constitution of the patient; the mode of treatment, and duration of the disease, the termination; and, lastly, the remarks suggested by each method of treatment.

M. Alquié, professor of internal pathology at the Val-de-Grâce, found—

1. That of forty-two soldiers attacked with diarrhœa, of different degrees of severity; thirty-six were cured in twelve days; twenty-four by the extract of monesia, given in pills, in the dose of from eighty centigrammes, to a gramme (14½ to 18½ grains) a day; and twelve by the tincture, administered as a clyster, in the dose of eight grammes (147½ grains) in two hundred and fifty grammes (4607½ grains) of bran water.

2. That in two cases of menorrhagia, the extract and the tincture of monesia, given internally, soon calmed the pain, and stopped the uterine discharge.

3. That in four women attacked with profuse leucorrhœa, the extract of monesia given internally, and the diluted tincture injected into the vagina, were beneficial.

4. That in two cases of hæmoptysis, where bleeding, ligature of the limbs, and ordinary astringents, had been employed without advantage, the extract of monesia succeeded completely; and that several chronic cases of bronchorrhœa were benefited by the syrup of monesia, which was sometimes combined with opium.

M. Baron cities—1. A very remarkable case of chronic inflammation of the vagina, of a syphilitic kind. No advantage had attended the previous use of baths, local bleedings, emollient and astringent injections, the nitrate of silver; a year later, the diluted supernitrate of mercury, sulphurous baths, leeches, and the repeated application of blisters and sinapisms, were equally useless. In spite of these remedies, the discharge from the vagina became more abundant. Injections were then used containing thirty grammes (552 grains and $\frac{9}{10}$ths) of the extract of monesia in a hundred and fifty grammes (2764½ grains) of water. In eight days the discharge was much diminished, and in three weeks the patient was cured. The discharge returned in a month, but again yielded to the same injections.

2. A case of leucorrhœa. The discharge was copious, of a yellowish-white color, and accompanied with pains in the groins and lumbar regions; baths, leeches, and injections of

mallow water and laudanum, had produced no benefit. Injections of monesia, in the proportion of thirty grammes (562 grains and $\frac{9}{11}$ths) to a hundred grammes (3317½ grains) of water, were employed once a day, and the patient was cured in a fortnight.

3. Several cases of diarrhœa, which resisted the means generally used, were cured by the extract of monesia given internally, and clysters containing the tincture, in different proportions.

M. Buchez has employed the extract of monesia, and has remarked, that it delayed the progress of caries in the teeth, and that when combined with opium it often soothed the pain more effectually than the opium alone. He recommends the employment of the tincture to keep the gums in a healthy state.

M. Daynac speaks of the good effects he has obtained from the preparations of monesia (the syrup, lozenges, and paste) in several cases of the chronic catarrh of the old, in dyspeptic persons, and in the third stage of phthisis. He also cites remarkable cases of scrofulous engorgement, much benefited by the use of the tincture of monesia, in the dose of eight grammes (147½ grains) daily, continued for a greater or less time. Lastly, the extract of monesia in pills, in the dose of sixty to ninety centigrammes (11 to 16½ grains,) has been very serviceable in uterine discharges.

M. Laurand speaks of a well marked case of scurvy which he cured with monesia. The patient had had frequent epistaxis, which had several times required the nostrils to be plugged. He was made to inspire acidulated water by the nostrils, containing thirty grammes (552 grains and $\frac{9}{10}$ths) of the tincture to a pound of water. This stopped the hæmorrhage; but when the same thing had been done with acidulated water not containing monesia, it had not succeeded. The patient also took from a gramme to a gramme and a half (18½ to 27¾ grains) internally, every day. The same physician has ascertained the efficacy of monesia in a great variety of circumstances, particularly in gangrenous eschars on the sacrum.

M. Manec has employed the different preparations of monesia with success:—

1. In a man who, for six years, had had a large herpiginous ulcer in the bend of the groin, which had resisted every kind of treatment, and which rapidly improved under the use of monesia ointment.

2. In a great number of aged women, laboring under diarrhœa, and in persons affected with chronic bronchitis.

M. Monod has furnished some very interesting cases; some, of ulcers of the nose, and others of affections of the intestinal canal.—The ulcers were dressed with the powdered extract, and cured in a few days. In the other cases, the extract given in pills to the amount of sixty to a hundred and twenty centigrammes (11 to 22 grains) daily, was perfectly successful.

M. Payen, who has employed monesia in a great number of cases, has seen a patient in whom leucorrhœa was considerably increased by this medicine, administered two different times; the monesia was then tried as an injection, and the discharge, which had hitherto resisted every remedy, disappeared, and did not return. The same practitioner cites two cases of uterine hæmorrhage, where the patients were obliged to keep their bed for a fortnight at each menstrual period, and in which the monesia brought back the discharge to its healthy standard. Lastly, M. Payen has succeeded in cicatrizing an ulcer in the lower jaw, which for ten months had resisted every kind of treatment, both internal and external; and in healing ulcerated chilblains, by means of the ointment and the powdered extract of monesia.

Thus we see that monesia has been employed both externally and internally. It has been frequently administered during the chronic stage of bronchitis, usually alone, but sometimes combined with opium, and in the greatest number of cases it has seemed to act advantageously upon the disease, the expectoration and respiration being rendered more easy.

In many cases where pulmonary hæmorrhage was prolonged, having resisted various and generally efficacious remedies, the extract of monesia has stopped the spitting of blood.

In weakness of the stomach, monesia has a very favorable influence on digestion, and secondarily on nutrition. This medicine has also been very beneficial in chronic enteritis; it has chiefly succeeded against diarrhœa, from whatever cause it arose.

The efficacy of monesia taken internally has been less marked in leucorrhœa than in diarrhœa; yet it has been useful in the majority of patients who have taken it; but injections have been more advantageous.

In every case of uterine hæmorrhage where monesia has been given, it has succeeded in moderating and suppressing the discharge more readily than the other remedies which had been previously used.

Monesia has also been of great advantage in scorbutic and scrofulous affections, and has always benefited ulcers of a bad character, whether the ointment, or the pure extract powdered, or the acrid substance contained in it, has been employed.

Such is the compendium of the cases hitherto published, with the exception of four by M. Forget, which are the basis of the article that he has published in the *Bulletin Thérapeutique*, and which, as he says himself, neither tell for nor against monesia.

We may say, therefore, generally, that monesia shows its maximum of power in diseases of the digestive organs, in hæmoptysis, uterine hæmorrhage, and ulcers of the skin, or of the mucous membranes, at their origin. A remarkable point in this remedy is, that although it is gifted with energetic powers, and has acted upon the tonsils or upon ulcerations as an active stimulant, it has never irritated the stomach as tonics, properly so called, often do. In order to form a due estimate of its relative activity, we must not forget that it has always been employed after the exhibition of other remedies.

I now come to my own cases, the general results of which may be stated as follows:—

Monesia, when exhibited internally, in the dose of from 75 to 125 centigrammes (14 to 23 grains) of the extract daily, for eight or ten days, whether in the form of pill, tincture, or

syrup, has an immediate effect upon the digestive passages, and quickens the action of the stomach in a very remarkable manner. If the dose of the remedy is pushed to four grammes (74 grains) of the extract, daily, for fifteen or twenty days, the appetite increases, but the patients sometimes experience a feeling of heat in the epigastrium:* tenesmus and obstinate constipation may also come on; hence its action upon the digestive tube should be moderated by diminishing the dose according to the effect produced, and administering emollient or laxative clysters, as may be required.

Monesia ointment may be employed externally upon sores, in every case, but with more or less success, according to circumstances: thus I have seen it succeed in large and excessively painful ulcers, arising from the action of blisters, in sores produced by burns, in varicose ulcers and old wounds; in a word, whenever the sore is painful, and depends on a merely local affection. When this is not the case, and the ulcer is kept up by syphilis, scrofula, scurvy, or cancer, it is impossible to effect a permanent cure by merely applying the monesia ointment, washing the sores with the tincture, or sprinkling them with the extract or acrid principle contained in it. Yet, by employing these different preparations in a proper manner, we may hope to modify the sores, and even to cure them for a time. Generally speaking, the ointment, when applied to a sore, calms the local pain; the tincture thus used, produces a sensation of heat, which ceases immediately; the powdered extract more or less excites the sore, and the acrid principle in powder, when well prepared, has a special activity greater than caustic: hence it is a powerful remedy against fungous or atonic ulcers of a bad appearance; but as soon as these sores become painful, and especially when they are covered with a whitish pellicle, the use of the acrid principle should be discontinued; for it is usually this pellicle which, by preserving the surface of the sore from contact with the

* Showing that it *does* irritate the stomach, contrary to the assertion made a few lines before.—*Translator.*

air, and perhaps by becoming partly organized, produces cicatrization.

I have said expressly, that it is impossible to obtain a lasting cure of syphilitic or cancerous sores by the mere external use of this remedy; in such cases, therefore, we must have recourse to a specific treatment capable of acting on the system. I have found, that in order to effect the cure of scrofulous ulcers, the monesia must be employed internally, for five-and-twenty or forty days, and even longer, according to the case; and this in large doses, such as four or five grammes (74 or 92 grains) of the extract daily, in the form of pill, tincture, or syrup. In this way I have succeeded in curing or benefiting several scrofulous patients. Here follow two remarkable examples:—

Case 1.—A young man of 17, a printer, born of very healthy parents, came to see me in February, 1839, to have the little finger of his left hand amputated. On looking at the diseased parts, I saw it was a scrofulous affection of only eight months' standing. The first phalanx was much swelled, the soft parts covering it were livid, and there were three fistulous openings in the skin; two corresponding to the dorsal part of the phalanx, and the third to its palmar surface. They were surrounded with callous vegetations of a brownish color, and communicated with one another by means of subcutaneous fistulous passages. By introducing a blunt probe into the sores, it was easy to reach the bone of the finger, and to ascertain the detachment of the skin and the caries of a portion of the phalanx. The suppuration was serous, yellowish, of a faint odor, and contained some flakes of a substance which seemed carious. Strong pressure of the diseased tissues occasioned hardly any pain. On the back of the hand and left elbow, there was also a swelling of the skin and of the subjacent parts, looking like the little finger. The swelling and livid patch extended from the elbow* to the inside of the bend of the arm; its cen-

* The original here has *cou*, but this must be a misprint for *coude*.—*Translator.*

tre was ulcerated, and covered with a thick crust, which, according to the patient's report, was renewed every two or three days.

I began by sprinkling the acrid principle of monesia on the small sores of the finger. After some days' dressing, the swelling of the soft parts began to diminish, and at the end of about twenty days, the fistulous openings entirely closed. The diseased tissues at the back of the hand then ulcerated, and the acrid principle being employed as above mentioned, in a few days a cure was effected. There remained only the sore upon the elbow, which had been purposely dressed with cerate. It continued to suppurate, and to be covered from time to time with a fresh crust.

The patient was in this state when I presented him to Dr. Bailly, who had been commissioned by the Academy to report on the effects of monesia. The affection appeared to him to be evidently scrofulous, and the result obtained to be very satisfactory. The disease, however, soon reappeared; the fistula of the finger began to suppurate again; there was swelling and livid redness of the soft parts, with engorgement and induration of the back of the hand; the sore on the elbow became larger and deeper. The patient now entered the hospital of St. Louis, where he had internal medicines as well as fumigations, sulphurous baths, &c. In a month, he came out, with the diseased parts in a worse state than ever. I now prescribed the internal use of monesia—namely, twelve pills, each containing 20 centigrammes (3½ grains,) and two spoonfuls of the tincture. The sores were dressed with common cerate. Under this treatment, the patient was cured in thirty-five days. Nevertheless he continued to take five pills a-day, till the fiftieth day.

Since July, the diseased parts have been constantly improving, and a lasting cure may be hoped for. It is right to state, that in this case the preparations of monesia did not cause tenesmus or constipation, although the patient did not employ any purgative; the only thing he complained of, was too much appetite.

Case 2. M. ——, æt. 40, who had always enjoyed perfect health, came to France two years ago, and perceived, in the month of April, 1839, that he had an indolent tumor in the left inguinal region. Several physicians of the capital were consulted, and they ascertained that it was a swelling of one of the superficial lymphatic glands, situated in the bend of the groin. On the 21st of the same month, I was also consulted by the patient. The diagnosis was not difficult, but the point was to know how the tumor would turn out. My prognosis was favorable, like that of all the other physicians, excepting M. Lisfranc, who thought that the swelling of the gland, though slight, depended on a general affection. On the 2d of May the groin continued to swell, and from that time all the other glands of that part, as well as of the left iliac fossa, swelled considerably; and this was soon the case with those of the opposite side. Twenty pages would scarcely suffice to tell all that was prescribed by the physicians, and patiently submitted to by M. ——. No remedy was of any use, except for a short time ; and I therefore proposed monesia, in the dose of one hundred and fifty centigrammes (twenty-eight grains) of the extract a-day. The patient at this time was extremely weak, ate but little, and was feverish every day. In a week, digestion had improved; there was a sensible increase of strength, and no fever. The sores were dressed with the monesia ointment. In consequence of these results, I tried to augment the dose of the medicine, and, besides the extract, the patient took two spoonfuls of the tincture, and from four to six of syrup in an infusion of hops. As to the sores, which obviously grew better, the same dressing was continued morning and evening, and every thing promised a speedy cure, when constipation and a most painful tenesmus came on, which obliged us to suspend the treatment. In a few days the sores became larger and larger, fungous, and of a bad appearance.

The dressing was then changed—extract of monesia in powder and the tincture being employed; but these remedies were almost as useless as a host of others which were successively

tried. It then seemed clear to me that the internal use of monesia had alone produced the improvement, and its use was accordingly resumed, taking care to make laxatives a part of the treatment. For this purpose the patient had two glasses of Enghien water every morning, and an emollient clyster. In a fortnight, the good effects of the monesia were again perceived; and this was more to be attributed to its internal use, as the dressing had been performed with simple cerate.

At present, the swelled glands of the groin are softening and disappearing, without any suppuration. Those of the iliac fossa are diminishing in size; the sores have cicatrized, and the disease, far from attacking the lymphatic glands of the other parts of the body, as is commonly the case, is localized, and is much lessened. The patient eats with a good appetite, sleeps well, and takes exercise three hours a day, which makes us hope for a fortunate termination of the disease.

Another result which I have obtained from the use of monesia, and which has been observed by other practitioners likewise, is its action upon the uterus in cases of menorrhagia. I will give two instances :

Case 3.—Madame ——, of a plethoric constitution, was attacked, after the catamenial period, with a flooding, which obliged her to keep her bed, and seek for advice. After having employed cold drinks, ligatures on the limbs, cupping-glasses, and other revulsives, without success, I made the patient take five monesia pills, each containing twenty centigrammes (three grains and three-fifths.) The next morning she was very weak; the skin burning, the pulse scarcely perceptible, the face pale, and the eyes sunken. She had shivering fits from time to time, a sensation of weight in the loins, transient colic pains, and headach, with sleepiness; and what was more, the hæmorrhage did not diminish. I then prescribed twelve pills of extract of monesia to be taken every hour. The discharge stopped the same day and never re turned.

Case 4.—Madame ——, aged 20, who had been married

six months, had frequent pains in the loins; and in a few days a flooding came on, which obliged her to keep her bed. The hæmorrhage increased, as soon as the patient got up; there was no pain in the abdomen, and no constipation; the pulse was weak and irregular, and from seventy-six to eighty in a minute. Revulsives, cold and acidulated drinks, clysters of cold water, and compresses dipped in iced water and applied to the thighs, had no effect. The ergot of rye was then employed, but as this excited vomiting, it was discontinued, and pills of the extract of monesia were ordered to be taken every hour, until an effect was produced. After fourteen pills the hæmorrhage ceased. The patient then took cold broth at intervals, and in spite of the lightness of this food, the discharge returned in the evening with violence, and again ceased after the exhibition of ten monesia pills.

On the following day, the dose of the medicine was diminished to seventy-five centigrammes (fourteen grains) and in six days the patient was quite well.

Quite lately, I employed the acrid principle in powder, in the dose of fifteen centigrammes (two grains and seven-tenths,) taken in a prune; it was to stop a uterine hæmorrhage, which had suddenly come on during the night; the discharge ceased the same day. But as this case stands alone, additional facts are necessary to prove the power of the acrid principle under such circumstances. In every case, monesia acts in a remarkable manner upon the uterus, when it is not in its natural state. This new medicine may be used in different ways, and it acts on different organs, particularly when they require to be strengthened without too much excitement.

This is confirmed by the following passage from M. Buchez:

"I have tried the extract of monesia," says this skilful practitioner, "in different affections of the mouth, particularly in inflammation of the gums, and uniformly with advantage. Its application produced a good effect, by almost instantaneously soothing the pain, which often accompanies inflammation. This mode of treatment I have found very successful

in the scorbutic swelling of deseased gums, and it has removed affections which had previously resisted other remedies. When caries of the teeth is attended with pain, the application of monesia is sure to remove it in a few moments."

When all the ascertained facts are compared together, one is struck by the very peculiar tonic action of monesia on every organ. As its powers have been tried in more than four hundred cases, we may be allowed to consider monesia as a very useful remedy, under several circumstances, particularly scrofulous affections and uterine hæmorrhage. Hence to the art of healing it is a real acquisition; nor is it to be imagined that this tonic has any analogy with those already known:* quite lately a tannin ointment, and monesia ointment were tried and compared with each other, and the advantage was on the side of the latter. Moreover, it is clear that every medicine acts in its own way, and that there cannot be two whose special effects are the same. Well informed practitioners know that one purgative cannot be indifferently substituted for another; that every narcotic has not, in the same degree, the power of soothing and producing sleep; that the action of the various tonics is also very different; and that the general effects of medicines are like the difference of faces; many resemble each other at the first glance, but none cansustain an exact comparison.

The London, from Paris Medical Gazette.

*There is some mistake in the original here: "que l'on ne croie pas que ce tonique ait quelque analogie avec ceux deja connus;" for, granting that its effects are not identical with those of any other tonic, there is a well marked anology.—*Translator.*

ART. XII.—MEMOIR UPON THE ORIGIN AND DISTINCTIVE CHARACTERS OF THE TURPENTINES. By M. Guibourt, Professor in the School of Pharmacy.

Read before the Society of Pharmacy of Paris.

I desire to occupy the Society with some of the resinous productions known by the name of Turpentines. It is not because there can be brought forward many new circumstances connected with a subject so old and so often treated of, but because error is every where intermingled with truth, and even at the present time there exists among pharmaceutists and druggists so much uncertainty with respect to the distinction between the different species of turpentine, that it appears to me proper to set forth their characters with more precision than has hitherto been done. If I have been enabled to succeed in this undertaking, after much research and attention, I am indebted for it to the kindness of two fellow members, who, by their residence in the places where these products are obtained, have procured for me genuine specimens of them; one of the individuals is M. Bonjean, sen., of Chambery; the other is M. Choulettee, pharmacien, of Strasburgh.

With the ancients the word *Terebinthina* was but an adjective noun, which, joined to the generic name *Resina*, was exclusively applied to the product of the *Pistacia terebinthus*. *Resina terebinthina* meant resin of the *Turpentine*, as *resina lentiscina* signified that of the lentisck; *resina abietina* that of the fir, and so of the others; as *resina larix, or laricea, resina cyparissina, picea, pinea, strobilina*, &c.

But the superiority which for a long time was accorded to the *turpentine resin*, the name of which was most frequently employed in speech, and the habit assumed, for brevity, of dropping the word resin, have had the effect of converting the adjective into a specific noun substantive, and this in its turn became generic, when applied to other liquid resins, which were regarded as proper substitutes for the first. Finally, in our day, this noun has received a still larger signification,

which consists in bestowing it upon every fluid or soft vegetable product, formed of volatile oil and resin, without benzoic or cinnamic acids; as, for example, the fluid resins of *Copaifera*, *Balsamodendron*, *Hedwigia*, *Calophyllum*, &c. While, according in the utility of thus designating by a common and unequivocal appellation the preceding products, which, in reality, are neither balsams or resins, I shall here confine myself to the turpentine of the Pistacia terebinthus, and those of the Coniferæ of Europe, which are the Larches, the Pines, and Firs.

Of the Turpentine from the Pistacia terebinthus, or Chian Turpentine.

I have stated that the ancients recognised as turpentine only that from the *P. terebinthus.* They obtained it principally from the Grecian islands, from Lybia, Cyprus, Syria, and Judæa. Andromachus, the father, prescribed for the theriaca the turpentine of Lybia, at which Gallen wonders, as that of Chian was reputed best by all physicians. "Yet," says he, "I esteem that of Lybia equally well, when it is good, but it is not unknown that it is not always as good as that which comes from Chio. Good turpentine is also obtained from Pontus, and other places, but that of Chio is superior to all others for its odor and taste."

The ancients have praised this Chian turpentine highly, but at the same time have described it imperfectly. It is necessary to join together scraps of phrases in order to determine some of its characters, and still we are tempted to believe that they knew it only as it was more or less sophisticated. "Turpentine," Dioscorides tells us, "should be white, transparent, of the color of glass, inclining to blue, smelling of the tree. In qualities it is superior to all other resins; those which nearest approach it are the resins of the lentisck, of the pine and fir. Next come the resins of the pitch fir, and of the cones of the cultivated pine." Galen places in the first rank of resins that of the lentisck, or *mastic*, and of the others, says he,

turpentine is preferred, which possesses marked astriction, *joined to a certain bitterness.*

Jacques Sylvius adds two errors to the incomplete and inexact characters of Dioscorides and Galen. According to him, the best turpentine is of a bluish-white or greenish, transparent, and of the odor of the tree—*sub bitter, biting to the mouth and larynx, liquid.* Finally, by running over authors from Dioscorides to the present, we come to Pomet, before meeting with the true character of Chian turpentine. This substance, he tells us, is of almost solid consistence, of a greenish-white, almost without taste or odor, and especially destitute of bitterness, which distinguishes it from the other turpentines. Lemery, Tournefort, Chomel, and Murray, speak of this turpentine in almost the same terms, and the authors of our own time have scarcely varied from them. Yet many of them, as it will be easy to show by quotations, give still to this resin perfect transparency, a strong penetrating odor, and an acrid and bitter taste, or, indeed, an odor of citron, and a certain acridity; it is well, therefore, to settle definitely the true characters.

In the first place, Chian turpentine is not transparent. I have found in some shops and collections a resin perfectly transparent, very consistent, and of an agreeable but feeble odor, which was labelled Chian Turpentine; but the golden yellow color of this product, and its marked bitterness, made me suspect the name, and having, in fact, broken the upper layer, which was hard and inodorous, I found, interiorly, the fragrant and sweet odor of Canada balsam.

Chian turpentine is naturally very consistent, and it is often very solid. It is at least nebulous, and sometimes almost opaque. It is of a greenish-gray, or greenish-yellow color. Its odor appears very feeble in the air, but when it is enclosed in a glass vessel, this is retained sufficiently strong and agreeable, resembling that of fennel or gum elemi. It has a perfumed taste, devoid of all bitterness and acridity, and closely resembling that of mastic. Like mastic, Chian turpentine dissolves in all proportions in ether, and leaves, when treated by alcohol,

a glutiniform resin. This coincidence of properties is remarkable, but ought not to surprise us, on account of the close alliance of the trees which produce the two resins. Thus am I entirely of the opinion of authors who are unknown to me, but have been frequently cited by J. Bauhin, under the name of *monachi;* these monks say that when Chian turpentine is not to be procured, the substance which will best supply its place is mastic, and not the resins of the Coniferæ.

To finish that which refers to Chian turpentine, I shall call to mind a circumstance connected with the tree which produces it. According to Theophrastus, this tree is male or female. With the ancients, the qualifications referred to have no connexion with the sex of plants, but here they are found justly applied. Theophrastus alone distinguishes between two female trees: one bearing red fruit the size of a lentil, not edible, the other producing fruit, at first green, then red, finally black, and of the size of a bean. We could with difficulty comprehend, at present, the simultaneous existence of two different fruit-bearing trees for one sterile, if Duhamel had not given to us the explanation in his *Treatise upon Trees and Shrubs,* in accordance with the observation made upon the spot by Consineri; it is that this species comprehends three individuals, the first male, the second female, and the third androgynous, that is to say, carrying both male and female flowers. The last are those producing the smallest fruit, which is ligneous, and almost devoid of kernel. It is a singular conception of nature, where an organ is fitted to be fecundated, and the product is arrested in the middle of its development, and cannot serve for the reproduction of the species. The proper female trees alone furnish perfect fruit, susceptible of germination. This fruit very much resembles the pistachia, and may be eaten for them, although it is less agreeable, and is only employed by the lower classes. I have thought it proper to refer to the existence of these androgynous trees, because no mention is made of them in the modern books, and once an observer, after thinking he had made the discovery, experienced the mortification of being shown, by a thumber

of old books, that the fact had been known for a thousand years.

The Turpentine of the Larch.

This resin was known to the ancients, who obtained it from the same countries as ourselves; for Dioscorides tells us, "there is brought from Sub-Alpine Gaul (now Savoy) a resin which, by the inhabitants, is named *larica*, that is to say, obtained from the Larix;" but he tells us no more. Pliny sufficiently defines it by saying "the resin of the *larix* is abundant; it has the color of honey, is more tenacious, and never becomes hardened." But he knew very little of the tree, as he supposes it to be an evergreen, like the pines and firs.

Galen praises highly the resin of the larch, and compares it to the true turpentine. "Among the resins," he tells us, "there are two very sweet, the first is named *turpentine*, the second, *larix*. And again, "we, who know that the best of all the resins is turpentine, employ it in the confection of medicines, and yet if we have only that of the *larix*, why should we not use it, as it is like the other?" Yet further; "we have demonstrated that the resin named larix, is nearly the same as turpentine."

Finally he tells us, "the most humid (liquid) of all the resins, is another kind of *larix*, for this is, thus to speak, two-fold, one being entirely like turpentine, and the other more liquid, more acrid, hotter, and of a stronger odor."

It may be said that it was Galen who established the reputation of the resin of the larix, and who has caused also the confusion existing among the different products now known under the name of turpentine; the first, by the almost complete disappearance of that of the pistachia, which it was supposed unnecessary to procure; the second, by the idea which was generally spread, that the turpentine of the larch should be the most beautiful of Western Europe; a fact true only of that of the fir; hence merchants and druggists have mistaken the turpentine of the larch, for that of fir, and the contrary.

Mathiolus is the first author who can aid us in unravelling the confusion which has been stated. The following is what he says, in his commentaries upon Dioscorides, Liber I. Chap. 74.

"There is obtained from the larix, a resin erroneously named *turpentine*, since the true turpentine is derived from the pistachia; but as for a long period the merchants bring only a small quantity of this, physicians and druggists employ in its place the resin of the larch, and from this practice results the name given to it of turpentine."

"The inhabitants of Trent, and the adjacent country, give to the resin of the larch, the name of *larga*, derived from *laricea* or *larigna*. It does not flow naturally from the tree, and to obtain it, it is necessary to pierce the trunk to the centre with an auger. The resin which flows out, is received in vessels fabricated from the bark of the pine. The young trees produce the most transparent resin, and the old a thicker kind. The pitch tree produces between the bark and the wood a concrete resin like gum; sometimes, however, there runs from it a liquid resin like that of the larch; but it is the fir, which contains in its bark the excellent liquid named *lacrimo* or *tears of fir*, of which the ancients have said nothing that I know of, at least it is not thought to be that designated by Galen, as *liquid resin of the pitch tree*, which the colporteurs sold in place of turpentine."

"They are deceived, (continues Mathiolus,) who take the tears of the fir for the clearest resin of the larch. The first collects in vesicles, concealed between the laminæ of bark, and flows out when these are separated, while the resin of the larch flows, when the trunk of the tree has been perforated to the centre. Some mix the resins in order to increase the profit, as that of the fir is in higher estimation than the other; others again strain it several times, until it becomes transparent, in order to sell it for the resin of fir;—for there are few druggists who know how to distinguish the one from the other. Still the fraud can be detected, as the tear of fir is much more liquid, of an infinitely more agreeable odor, and of

a more bitter taste. If kept for a year, it acquires a feeble yellow color."

It follows from these passages of Mathiolus, that, in opposition to the authority of Galen, and the physicians who regarded the resin of the larch a suitable substitute for Chian turpentine, and place it in the first rank of indigenous turpentines, in his time, the turpentine of the fir was more esteemed, and of higher price. It was only the most transparent, and repeatedly strained turpentine of the larch, that could be mistaken for it, and yet this could be recognised by its greater liquidity, its infinitely more agreeable odor, and its more bitter taste, (this last character is inexact.) Again: much noise has been made in all the books on the Materia Medica, with respect to the Venice turpentine, which was the most beautiful of all, (always Chian turpentine excepted) and which on this account alone, has always been attributed to the larch. Well! this Venice turpentine was nothing else but that of the fir, as has been proved by Belon, in his work upon the Coniferæ, published in 1553.

"A great fraud (Belon tells us,) is committed daily by many persons, who openly employ the oily resin of fir, in place of turpentine. The true turpentine is neither liquid or entirely solid, but presents an intermediate consistence. Yet, like all other resins, it hardens by age. The resin of fir would never run from the tree, if it were not extracted artificially. The people in Italy, name it *olio d'aveto*, which is oil of fir. The French call it, *Venice turpentine*, to distinguish it from the larch, which they call *common turpentine*. The oily resin of the fir is extracted in the following manner: the herdsmen, that they may not be idle, frequent the place where the young firs grow, provided with a horn. They know that the firs with smooth bark abound with vesicles, while on the contrary the rugged bark of the old trees, is destitute of them. They then press the vesicles of the young trees, with the edge of the horn. However diligent they may be in this operation, they can scarcely collect more than four ounces of resin per day, for each vesicle does not contain

more than two drops at most. Hence, it is that this resin is rarer than the others, and dearer."

To finish the account of the resin of the larch, let us present the description given by Jean Bauhin, in his Historia Plantarum. "This resin is of the consistence of liquid honey, never becoming hard, of a yellow color, sometimes vitreous and transparent, and of a very bitter taste, moderately acrid, persistent, and odoriferous."

This short description is the most exact that has been published; and all those who have followed it, by deviating from it more or less, have thrown us into confusion. Of this I have cited, in the Historie Abregée des Drogues Simples, many examples which I will not repeat here. I had a long time, but without success, endeavored to procure an authentic specimen of the turpentine of the larch. Finally, in 1837, at the request of M. Bonjean, sen., pharmacien at Chambery, the Bishop of Maurienne granted permission to collect it in the woods of his bishoprick. This turpentine, which I submit to the Society, is thick and very consistent, as it remains some moments without running, when the vessel is turned up which contains it; it is uniformly cloudy, as if it held in suspension a resin in a minute state of subdivision, but the resin is not deposited upon standing, and the bottom of the vessel presents only a few earthy particles. It has an odor entirely peculiar, tenacious and oppressive, but more feeble than that of citron turpentine, but much less agreeable; weaker also than that of Bordeaux turpentine, and entirely different. It has a very bitter taste, which is persistent and connected with great acridity in the throat.

The larch turpentine for a long time preserves the same thick consistence, without forming in the air, and still less in a closed vessel, a dry and cracked pellicle upon its surface. When it is exposed to the atmosphere, spread in a thin layer upon a sheet of paper, after fifteen days the finger adheres to it strongly. Its drying property is then almost lost. It does not solidify appreciably by the addition of a $\frac{1}{16}$th of calcined magnesia. Lastly, it dissolves completely in five parts of alco-

hol, at 36°. The turpentine of the larch is not rare in commerce, where are found three species of the kind, well distinguished: 1st, *Common Turpentine*, or *Bordeaux Turpentine*, thick, granulated, opaque, of a strong smell, much used by the colormen, but rejected by apothecaries; 2d, *Citron Turpentine*, the most beautiful of all, liquid, of a sweet odor, of high price, and rarely employed; 3d, *Fine Common Turpentine*, most used in the shops, generally named *Strasburg Turpentine*, but in reality coming from Switzerland. This is produced by the larch. The only difference between it and the specimen of Maurienne, is that being collected in large quantity, and filtered and allowed to settle in large masses, it is more fluid and transparent, but never liquid, and never as transparent as the turpentine of the fir can be. The other characters are such as have been stated.

Journ. de Pharm.

(*To be Continued.*)

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

The annual meeting of the College was held March 30th, 1840.

Henry Troth, Vice President, in the Chair.

The minutes of last stated meeting were read and adopted.

The minutes of the Board of Trustees were read, from which the College is informed that Ambrose Smith, Linneus R. Gilliams, and Claudius B. Linn, have been duly elected *resident* members, and Thomas Seabrook an *associate* member of the Philadelphia College of Pharmacy.

The following gentlemen resigned their right of membership in this College, viz.: Joseph Scattergood, Charles H. Dingee, John H. Dingee, and D. L. Hutchinson.

The Annual Report from the Publishing Committee of the

American Journal of Pharmacy, was read and adopted. They state that the publication of the work entrusted to their care, under the authority and sanction of this College, has continued to claim their attention; that four numbers have issued from the press since their last report, fully sustaining, in their opinion, the reputation which the work has always enjoyed among its readers. They state that the arrearages due to the Journal, (principally from subscribers residing out of the city,) would exceed $300.

At a special meeting of this College, convened by direction of the President on the 21st of last February, the following communication was read:

Philadelphia, February 12th, 1840.

Dear Sir,—

I have been directed by the Committee for Revising and Publishing the United States Pharmacopœia, appointed by the late National Medical Convention at Washington, to address to the College of Pharmacy, over which you preside, in pursuance of a resolution of the Convention, a request for the co-operation of the College in the work in which the Committee is engaged.

I need not inform you that the Committee will be very happy to receive any suggestions in relation to amendments, additions, or omissions in the Pharmacopœia, which may be offered by the College. They venture to hope that the great importance of a uniform system in the nomenclature and preparation of medicines, and the interest which the Pharmaceutical, as well as Medical Profession, cannot but feel in this object, will induce the College to lend the valuable aid of their practical experience and skill.

With great respect,

George B. Wood, M. D.

Chairman of Committee for Revising and Publishing U. S. Pharmacopœia.

To D. B. Smith, Esq.,

President of the Philadelphia College of Pharmacy.

Whereupon it was

Resolved, That a committee of five members be appointed to take the foregoing communication into consideration, and to report at a future meeting what course to pursue.

The Chair appointed WILLIAM R. FISHER, HENRY TROTH, ELIAS DURAND, WILLIAM W. MOORE, and CHARLES ELLIS, that Committee.

The following is their Report:

To the President and Members of the Philadelphia College of Pharmacy.

GENTLEMEN:—

The Committee appointed by resolution of 21st of February, to take into consideration, and report at the next stated meeting, upon the communication addressed to the College, by the Committee of the National Convention for revising and publishing the United States Pharmacopœia, respectfully reports—

That, in accordance with the terms of the resolution under which they were appointed, they have duly considered the communication referred to them, and, after having examined and maturely deliberated upon the subject in all its bearings, they are disposed to recommend that the College accept the invitation which has been tendered to it, to become, to the extent of its abilities, a co-laborer in the great work in which the National Convention is engaged. The Committee is of opinion that the College possesses, within its range, ample means to contribute towards a National Pharmacopœia, and that from the intelligence, zeal, and industry of its members, may be derived important aid of a practical character, and of the highest utility. The pages of our own Journal, during the period which has elapsed since the publication of the last Pharmacopœia, exhibit conclusive evidence that neither talent nor industry are wanting on the part of the members and alumni of our institution, and the pages of that Pharmacopœia itself, show that the authority of our Journal, although then in its infancy, was deemed, by the Convention of that period,

sufficiently established and respected, to elicit regard to its suggestions and improved formulæ. Sensible of the advantage which must result from the combined labors of the medical and pharmaceutical professions, and of the oversight which had been committed by a former Convention, in not inviting the attendance of a delegation from the Colleges of Pharmacy of our country, the late Convention remedies the neglect by the passage of a resolution, seeking our co-operation; while in the schedule adopted as the constitution of the ensuing Convention, ample reparation is made, and due regard paid to the value and importance of a representation of practical pharmacy. The Committee, then, is of opinion that no feeling of neglect should be indulged, but on the contrary, that the National Convention has paid a tribute of respect to our body, and an acknowledgement of our ability to aid it, by its official act above referred to. Indeed, independently of all other considerations, our duty as good citizens requires that we should contribute our aid in a work so important to the health and well being of our neighbors and society, and impels us to communicate, for the general good, whatever study or observation may have placed within our grasp. No sentiment of injured pride should counteract duties of such character as these, nor induce us to withhold information from an apprehension that our services in the general account may be overlooked.

We regard the present as a favorable opportunity for asserting and evincing the claims which our College possesses for regard and utility, and that by no means can these claims be so efficiently maintained as by an exhibition of her powers, her ability, her zeal, and her earnest efforts to do good. The whole labor of preparing our National Pharmacopœia is a voluntary one, unattended by emolument or distinction for those who have undertaken it, and it becomes each of us to share in the burden, as we shall each share in the sole reward, a "mens sibi conscia recti,"—a mind conscious of having discharged its duty.

The Committee waives all further argument upon this sub-

ject, believing that sufficient reasons have now been assigned to establish the propriety of their recommendation, that the College should participate in the revision of the Pharmacopœia. They believe that every member will be disposed to assist, by adding his quota of experience or inquiry to the mass, and that valuable and essential amendments must result from the combination of our pharmaceutical with the medical science of the nation. Entertaining these views, they conceive they should be doing injustice to the College, the profession, and the country, were they to recommend any other course than that which they have already announced.

Having determined, then, what they should recommend as the proper action of the College upon the communication referred to them, the Committee anxiously sought to devise a mode by which the action of the College, if undertaken, should be rendered prompt and efficient. This they have endeavored to do by presenting a digested plan of operations, by which the Committee to be appointed hereafter on behalf of the College, shall be guided in the prosecution of their work. While they have endeavored so to frame this schedule or fundamental law, by which the Committee is to be governed, as to ensure a proper direction to, and systematic arrangement of their labors, it will be observed that its terms are so general in their character as to put no restraint upon individual judgment, as regards the revision of the work, and that in every respect the private personal views of those who may constitute that Committee, are unfettered in regard to the amendments which they may propose, whether alterations, additions, or abstractions, be their character. The Committee, in preparing this outline, which they mean to propose for the organization of the Committee of Revision, has been guided by the best model within their reach, perhaps any where to be found, the plan pursued by the Medico-Pharmaceutical Board, which effected the revision of the Paris Codex. And they deem the excellence of the work emanating from their councils a sufficient argument for our adoption of their mode of organization. In those details which have not been com-

municated by the French Board, your Committee have been governed by the best lights afforded by their own experience and judgment. It cannot be deemed essential that the Committee should here comment on the detail contained in the resolution which they propose to submit; but it is thought not altogether irrelevant to say a few words further in explanation of the course which it is proposed the Committee of Revision shall undertake, as well as one or two other considerations connected with the subject.

This is the first labor of the kind undertaken by the College, and there is every reason to believe that it will be regarded as a precedent by those who may succeed us in a similar duty, and that whatever course may be adopted now, will be regarded as an example worthy their imitation at least, if not absolutely imperative upon them. Let us, therefore, carefully examine and maturely decide upon what our course shall be, so that whatever importance our successors may attach to it, it shall, at least, deserve their respect as a model as perfect as we, without practised experience in revision, could have designed. Every step of our progress will hereafter be narrowly scanned, and we, therefore, from the outset, are called upon to be accurate and circumspect. From the appointment of our Committee, to the manner in which they shall proceed, the College of this day is responsible to those who may hereafter occupy the seats now filled by ourselves, and from a due sense of the responsibilities thus imposed, is the preparation of a code for the guidance of our Committee rendered the more imperative upon the College. So naturally and unconsciously in all cases do we look to our predecessors for advice and information, that we may reasonably anticipate such a retrospect and review of the early action of the College upon this subject, by the Committee who may be appointed, as will enable them to proceed knowingly and intelligibly to the discharge of their duties. This reference to precedent is by no means reprehensible, or to be shunned; on the contrary, it arises from a proper respect for the experience and attainments of age and intelligence, and must therefore

be regarded as decorous and commendable; we are led to refer to it merely as imposing duties of a peculiar character upon ourselves, in our action as a body. Anticipating the existence of this deference to our views, upon the part of the Committtee, we, by definite, decided action, point out the course which we would have them pursue, as calculated most efficiently to give energy, system, and excellence to their action. We tell them you must appoint a secretary, who must arrange and preserve your work. We tell them, you must subdivide your number, so that the known advantages resulting from a division of labor may be secured. We tell them, you must have frequent meetings, so that the labors of your sections may be examined and compared. We tell them, invite the co-operation of all who can render you assistance, or contribute to your usefulness, so that the greatest extent of information and inquiry may be embraced. We tell them, submit any doubtful matter to experiment, so that reliance may be placed upon the product of our formulæ. We tell them, be as speedy as you can, consistent with due care; and then we say, in fine, give the Pharmacopœia a complete revision. Reject what is useless, add what is wanting, improve what needs correction. We say, in addition, amend, alter, suggest, abolish, at your discretion, only give us your reasons, briefly as may be, so that you may satisfy us, and the profession, of the propriety of the change. Give us a work exhibiting the science of the age, and representing the progress of American Pharmacy and Medicine—twin sisters, whose growth and improvement from childhood to maturity, has been attended with the vigor of youth, and the bloom of health; which, heightened by the influences of united interests and pursuits, must fail entirely, or sensibly decay, in both, should rudeness sever, or neglect destroy, the bond of sympathy by which they are bound together.

With such instructions, it is conceived, the Committee can have no doubt as to their duties, and what course of action is expected of them, and the College is itself relieved of all the charge imposed upon it, in establishing a precedent for future

guidance. Far be it from this Committee to assert that such a course as is here recommended is faultless, and unsusceptible of improvement, but they do say such amendments have not occurred to themselves, and that in the plan offered is a good basis upon which experience may erect an improved structure.

But little more remains to be said, on this subject, but the Committee cannot refrain from directing the attention of the College to the fact, that in each branch of the proposed plan to which reference has been made, ample room for individual judgment has been reserved, and that the independent exercise of sound discretion is left untrammelled. In the choice of their Secretary, in their subdivision into minor committees, in determining the period at which they shall convene and commune, in looking abroad and around for coadjutors, in determining what shall be submitted to experiment, and how those experiments shall proceed, in completing their work with a speed consistent with its proper execution, as great a range for the display of discretion and judgment, of intellect and industry, is afforded as can be at all desired by the most independent, or restive of restraint, among us. As members of the College, however, all those who may constitute the Committee, will have, indeed, at this moment enjoy, the right to propose any alteration, which may be thought desirable or necessary.

The Committee leave this branch of the subject, under a firm consciousness that their motives, at all events, in recommending what they do, are incapable of being impugned for faithlessness, to the true interests or honor of the College.

In regard to the extent to which the revision of the Pharmacopœia shall be carried, the Committee have nothing to say, conceiving that inquiry to belong exclusively to the Committee of Revision, and not to be at all within the sphere of their duties. Not in this light, however, did they regard an inquiry into the means and resources which the College possesses for carrying on the revision, as it would be needless in them to recommend the inception of a labor, which at the

same moment, they are conscious may never reach completion. Such a condition, however, as regards the work they recommend, is altogether hypothetic, as they have ascertained by personal inquiry that a committee of the number proposed can be readily selected from the College, who will zealously and industriously discharge the duty to which they will be assigned; and that efficient additional co-operation may be relied upon, to be derived from the service of those whose avocations will not permit a constant devotion to the subject, as well as from the valuable inquiries and manipulations of such of our alumni, as have not yet been associated with us as members. The Committee have, in a former part of this report, indicated their confidence in the professional ability possessed by the College for the faithful prosecution of the work, and they are here gratified to add their conviction that laborers are not wanting to ensure its able execution. They find that the College will be enabled to call to its service, the more mature councils of experienced, as well as the vigor and alacrity of younger minds, and that every desirable element can thus be blended in the discharge of this duty. Delicacy forbids that they should here enter more minutely into this subject; they, therefore, have prepared, and will submit, for the aid of the appointing power, a list of those who may be relied upon as capable and ready to perform the labor, and from whom a selection may be made.

The Committee cannot take leave of the inquiry proposed for them without adding a few words on the great importance of the main subject, the preparation of a National Pharmacopœia, possessing the necessary character to ensure uniformity by its general adoption. Such a work is of vast importance to society, and indispensable for a united understanding between the two professions for whose use it is expressly designed: a lamented want of uniformity in the preparations and nomenclature exists throughout our country, indeed our own community, and every effort should be made to remove this defect. It can only be accomplished by some sacrifice of individual judgment, and by a strict regard to the directions and

proportions emanating from the national representatives of Medicine and Pharmacy, in the results of whose counsels we may have perfect confidence, if we find all measures undertaken solely with a view to the general good, without party feeling, prejudice, or selfishness, all sections represented, and all sources of information opened for the examination and instruction of all.

To such a work we are now, for the first time, to bring our stores of professional acquisition, and it becomes us to do so without reserve or hesitation. Let us freely contribute our share to a work destined for our own information, and to some extent control, that we may have the cherished privilege enjoyed by the citizens of our happy land, in their civil capacity, of living under laws of our own creation. So let it be with our professional ordinances; let us participate in their enactment, and then, as good citizens or subjects, we may implicitly and conscientiously obey them.

In conclusion, the Committee will only add, that they submit their labors for the consideration of the College, conscious that they admit of examination and scrutiny, which, they trust, may be extended to them, in order that the action of the College may be rendered as complete and perfect as can be attained. Nothing but a sense of the consequences depending upon our first embarkation in such a cause, would have induced the Committee (or even justified them in doing so) to have occupied so much space in detailing their views. They cannot doubt but that their motives will be appreciated, and that they will not be charged with having attached too much importance to the duties assigned them.

They close with recommending the annexed resolutions :—

Whereas, The Committee for revising and publishing the U. S. Pharmacopœia, has, in pursuance of a resolution of the National Convention, addressed this College, and requested the co-operation of the College in the work in which said Committee is engaged; and, *whereas*, the great importance of a uniform system in the nomenclature, and preparation of medicines, and the interest which the pharmaceutic, no less than

the medical profession feel in this subject, render it highly important and proper that this College should contribute the valuable aid of the experience and practical skill of its members, in the most efficient way:

Therefore, Resolved, That this College acceding to this request, will undertake to procure a revision of the United States Pharmacopœia, to be submitted to the Committee of the Convention, to which all other projected amendments have been referred.

Resolved, That a Committee of six members shall be appointed, who shall be styled the Committee of Revision, and to whom shall be entrusted the entire charge of the work; to be subjected to the annexed provisions and regulations.

1st. The Committee shall appoint a Secretary; and subdivide into sections of such size as shall contribute most advantageously to a division of the labor.

2d. When thus organized, the Committee shall have power to fill vacancies; and invite the co-operation of members and graduates of the College.

3d. The Committee shall hold stated meetings at least once in two weeks, at times to be selected by it.

4th. The Secretary, who may be chosen from the College at large, or its graduates, shall keep a journal of proceedings, and arrange and compile the general results, so as to produce a systematic work.

5th. The Committee shall subject the Pharmacopœia to a thorough revision;—by adding to the Materia Medica such new remedies as use has established;—by removing obsolete or unworthy articles;—by adding to, and removing from the Preparations, in like manner and for like reasons;—by suggesting such amendments in formulæ, as experience or investigation may show to be proper;—by subjecting to experiment all such processes as, in their opinion, may require it, and generally shall make such alterations and amendments as in their best judgment may be needed, to bring the work up to the improved state of modern pharmacy, and to render it a type of the existing condition of the profession in this country.

6th. The Committee shall assign, as briefly as may be, the reasons for any changes which they may make, so that their propriety may be determined.

7th. The Committee shall prosecute the work as rapidly as is consistent with due care, and its proper execution; and so soon as finished, shall make a general report to the College.

All of which is respectfully submitted.

WM. R. FISHER,
E. DURAND,
CHARLES ELLIS,
HENRY TROTH.

Philadelphia, March 11th, 1840.

This being the evening for the annual election, the following officers, trustees, &c. were elected, viz:

President—D. B. SMITH.
Vice Presidents—HENRY TROTH, GEORGE B. WOOD.
Secretary—CHARLES ELLIS.
Corresponding Secretary—ELIAS DURAND.
Treasurer—S. F. TROTH.

Publishing Committee of American Journal of Pharmacy.

DR. CARSON,
G. B. WOOD,
C. ELLIS,
DR. BRIDGES,
DR. BACHE,
D. PARRISH,
E. DURAND,
JOHN C. ALLEN,
WM. HODGSON,
D. B. SMITH.

Trustees.

WARDER MORRIS,
DR. JOSEPH CARSON,
EDWARD ROBERTS,
JOSEPH C. TURNPENNY,
DILLWYN PARRISH,
THOMAS H. POWERS,
RICHARD M. REEVE,
JACOB BIGONETT,
DR. F. BACHE,
WM. W. MOORE,
JOHN WETHERILL, JR.
CLEMENT CRESSON,
PETER LEHMAN,
DR. ROBERT BRIDGES,
AMBROSE SMITH,
JAMES HOPKINS.

The Chair appointed the following Committee on revising United States Pharmacopœia.

Wm. R. Fisher, Chairman,	Wm. W. Moore,
Charles Ellis,	Thomas H. Powers,
Elias Durand,	John C. Allen.

TO THE MEMBERS AND GRADUATES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

The College of Pharmacy having engaged to prepare a complete revision of the United States Pharmacopœia, and the "Committee of Revision" being now organised, and about to engage in the active discharge of its duties, the aid and co-operation of the members and graduates of the College, in carrying forward the important work, to the due and successful execution of which the honor and standing of the College is pledged, are respectfully invited. Solicitous for the reputation of our institution, and anxious for the diffusion of all the light which can possibly be elicited, the "Committee of Revision" appeals to those who hold that reputation dear, who possess the means of irradiating much practical and theoretic truth, and without whose aid the most assiduous industry of the Committee will be insufficient to do full justice to the subject, to contribute fully and freely the result of their reflections, experience, and research, so that the revised work, which it is the duty of the Committee to prepare, shall exhibit the improved state of modern Pharmacy, and present a type of the condition of the science in this country. Referring to the preceding report of the committee who inquired into the expediency of engaging in this enterprise, for an explanation of the views under which the present Committee is appointed, the undersigned again renew the request that any suggestions, as regards alterations or additions, may be left with either member of the Committee, or

the Secretary. The stated meetings of the Committee will be held on every second Tuesday, commencing on the 21st of this month. It is desired that all communications should fully detail the reasons for alterations; and such comments upon new formulæ as will ensure their claims to preference over others which may have been suggested for the same preparation. It will also be proper to accompany formulæ with specimens of their results.

By order of the Committee of Revision.

WM. R. FISHER, *Chairman.*

WILLIAM PROCTER, Jr., *Secretary.*

The Committee consists of—

WILLIAM R. FISHER,	WILLIAM W. MOORE,
CHARLES ELLIS,	THOMAS H. POWERS,
ELIAS DURAND,	JOHN C. ALLEN.

WILLIAM PROCTER, Jr., *Secretary.*

April, 1840.

MISCELLANY.

Tests for Opium—Mode of keeping Extracts.—At a meeting of the Medico-Botanical Society, April, 1839, Mr. Everitt stated, that having lately had to conduct experiments for the purpose of deciding whether opium were present or not in the stomach of persons on whom a coroner's jury had to sit, he had paid some extra attention to the subject. Generally speaking, in the search after opium, it was the object of the chemist to eliminate the morphia; but it was difficult to decide whether this was present or not, inasmuch as other alkaloids would give the same results when experimented upon. Chemists had long known that meconic acid, when acted upon by a solution of a peroxide salt of iron, was changed to a deep-red color. So far, then, it was a test of the presence of opium. This test, however, was liable to doubt, inasmuch as sulphocyanic acid, which Tiedemann had proved to exist in the saliva, would be acted upon similarly to the meconic acid, on the addition of a solution of a per-salt of iron. Hence, at a trial at Glasgow, in which there could be little doubt that opium was present in the stomach of a person supposed to have been killed, the counsel for the defence of the prisoner objected to the testing of the presence of meconic acid by the solution of iron, on the above ground, and the objection was considered fatal. He (Mr. Everitt) had endeavored of late to obtain, by experiment, the means of distinguishing whether the red color in question was produced by the presence of meconic acid, or of sulphocyanic acid.* After a number of experiments upon this point, he had found that if the red color depended upon the presence of sulphocyanic acid, the addition of a solution of corrosive sublimate had at once an entire bleaching effect upon the tested liquid; while, on the contrary, should the red color depend upon the presence of meconic acid, the solution of corrosive sublimate would have no effect. The above test had held good in a great variety of experiments in which the tested fluid was combined with various animal secretions, &c.

Mr. Everitt then exhibited a preparation of extract of henbane, which he had kept in a close-stopped bottle for two years; the extract was in a high state of preservation. Previous to placing it in the bottle, he had drawn off all the moisture from the extract by placing it under an air pump with sulphuric acid. Mr. Everitt then threw out some hints on the advantage of keeping extracts free from moisture.—*Lancet.*

* Nearly ten years ago Dr. O'Shaughnessy pointed out in THE LANCET, the fact that the meconate and sulphocyanate of iron might be distinguished one from another by means of an alkaline solution. The sulphocyanate is immediately *bleached* to a dead pale white by the alkali, while the meconate, on the contrary, becomes deeper in its tint.—LD. ED.